Suid-Afrikaanse Tydskrif vir Geneeskunde
South African Medical Journal

Posbus 643, Kaapstad — P.O. Box 643, Cape Town

Kaapstad, 27 Julie 1957
Weekliks 2s. 6d.

Vol. 31 No. 30

Cape Town, 27 July 1957
Weekly 2s. 6d.

GENERAL PRACTICE SERIES

THE THYROID GLAND *

R. HOFFENBERG, M.D., M.R.C.P.

and

W. P. U. JACKSON, M.A., M.D., M.R.C.P.

From the Endocrine Clinic, Department of Medicine, Groote Schuur Hospital and the University of Cape Town

Major research in this field has recently been directed toward the elucidation of the nature and mechanism of the production and action of thyroid hormone. Currently the active principle of this hormone is thought to be tri-iodo-thyronine. This substance certainly is more active than thyroxine or thyroid-gland extract and promises to be of value in therapeutics.

HYPERTHYROIDISM

Diagnosis

The diagnosis of hyperthyroidism has been assisted by newer techniques, e.g. estimation of protein-bound iodine in the serum, or tests incorporating radio-active iodine. These measures require specialized laboratories and are not available to most practitioners. The diagnosis, therefore, still depends largely on careful clinical appraisal. Preference for cold weather, as such, is not an important symptom; it is far more significant if a recent change in weather tolerance is admitted.

The diagnosis of thyrotoxicosis may be particularly difficult in two circumstances:

1. The so-called '*masked*' *cardiac thyrotoxic*, where cardiac arrhythmia or decompensation may be the presenting feature. The patient is usually middle-aged or elderly, as frequently male as female. Tachycardia, numerous extra-systoles or auricular fibrillation are common, with or without cardiac failure. The florid manifestations of thyrotoxicosis are usually absent, but loss of weight, staring eyes, lid-lag or lid-retraction, with the presence of a goitre (generally nodular) may indicate the etiology. The response to anti-thyroid drugs is on the whole excellent. If the pulse rate of a patient with cardiac failure is not adequately controlled by digitalis, thyrotoxicosis should be considered. Nodular goitre is not uncommon in the elderly; nor is cardiac disorder. When both of these are present in a patient, it may be exceedingly difficult to assess the role of the thyroid gland in the production of the cardiac features.

2. *Anxiety states vs. thyrotoxicosis.* It is common to find young girls with physiological thyroid enlargement and features which may be due to thyrotoxicosis or anxiety state. Symptoms due to the latter commonly date from the time the patient first became aware of the 'goitre'. These symptoms may be dispelled by reassuring the patient that the goitre is not dangerous, will not grow inwards to choke her, and will not turn into a cancer. At times these states may be difficult to distinguish. Both may show loss of weight, nervousness, sweating, tachycardia, tremor. The cold damp hands of the anxiety state contrast with the hot, sweaty palms of the thyrotoxic. A normal 'sleeping pulse-rate' indicates anxiety neurosis. In doubtful cases a carefully-conducted therapeutic trial with one of the anti-thyroid drugs may help to establish the diagnosis.

Basal Metabolic Rates. This determination has a limited place in the diagnosis of thyrotoxicosis. In cardiac failure and in anxiety neurosis—where differentiation may be difficult—the BMR may in any case be raised. The test is of value only when the patient's metabolism is truly basal, both mentally and physically. Random out-patient determinations therefore are of no value. Far more significance may be attached to low readings to exclude thyrotoxicosis or in the diagnosis of hypothyroidism.

* This is the 2nd article in a series of 5 on endocrine disturbances by the same authors which are appearing weekly.

Treatment. Advances have been made in the *therapy of thyrotoxicosis.* Surgery, as opposed to long-term medical treatment, is probably best advised where the goitre is large or nodular, where the patient is middle-aged or older, where there are pressure symptoms, or where thyrotoxicosis is severe. In mild cases of thyrotoxicosis, pre-operative preparation with iodine will suffice; in more severe cases, an anti-thyroid drug (a thio-uracil compound or methimazole) should be given until the patient is clinically euthyroid. The drug should then be discontinued and should be followed by iodine for 2 or 3 weeks before operation. Initial doses of propyl-thiouracil range from 300 to 600 mg. daily in divided doses, of methimazole from 30 to 60 mg. daily. Generally it is possible to reduce this dose after 3-4 weeks as the patient shows signs of improvement. The practice of regular white-cell counts on patients taking these drugs is now considered unnecessary. Should a skin rash or sore throat appear, the drug should be stopped until a leucocyte count has been done. Continued conservative therapy succeeds best in young women with medium or small diffuse thyroid enlargements and with mild hyperthyroidism. Control is best achieved by use of methyl- or propyl-thiouracil or methimazole, a small maintenance dose being taken for a period of 12-18 months. With proper selection of cases about 70% of cures will result. Radio-active iodine treatment of thyrotoxicosis is available in few South African centres and requires expert handling. Its ultimate place in the treatment of thyrotoxicosis has not yet been established.

Iodine treatment alone is rarely prescribed in thyrotoxicosis today except as a pre-operative measure. Long-term treatment is inadvisable, as many patients show 'iodine-escape'.

HYPOTHYROIDISM

Diagnosis

The diagnosis of hypothyroidism usually depends on recognition of the insidious, subtle changes in the patient, often of such a diverse character that organic disease is overlooked. Deafness, menorrhagia, mental or physical lethargy, coldness, constipation, hoarseness of voice are common complaints. Apart from alopecia, the hair may give a clue in that it loses its lustre and often will lose its curl. Loss of the outer third of the eyebrows is not a valuable sign—it occurs far too commonly in normal and often not in hypothyroid subjects. A common symptom—which may need to be elicited—is loss of ability to perform delicate finger movements, e.g. knitting or sewing. Frequently there is a similar loss of mental dexterity, with inability to calculate accurately and fluently, loss of concentration and memory.

Most cases of primary hypothyroidism are associated with atrophy of the thyroid gland, which is then impalpable. Occasionally one encounters hypothyroidism in a patient with a large goitre. Thyroidectomy in such cases is not to be recommended since improvement is then not possible and, in fact, deterioration generally follows.

The term 'hypothyroidism' is used deliberately in this discussion to emphasize the distinction from 'myxoedema' in which the thickened, coarse, bloated features render the diagnosis easy. By 'hypothyroidism' is meant a clinical state short of myxoedema, less obvious and demanding more careful appraisal, but responding in an equally gratifying manner to thyroid administration.

Again careful therapeutic trials assist in confirming or refuting the diagnosis. Patients with hypothyroidism are sensitive to thyroid extract.

TREATMENT

The treatment of hypothyroidism is highly satisfactory. Thyroid sicca may be used in doses of 1, 2 or 3 gr. daily (more is seldom necessary). The starting dose should be not more than 1 gr. daily, and need not be less, provided the patient is kept under observation. Thyroxine may be given orally, 0·1 mg. producing the same clinical response as 1 gr. of thyroid extract. Tri-iodothyronine may supersede these substances, a dosage of 0·05 mg. being equivalent.

Response to thyroid hormone therapy is usually prompt. Within four or five days symptomatic improvement is noted, but it may be two or more weeks before objective response is observed.

It must be stressed that gross obesity is not a feature of hypothyroidism—the gain in weight which results from diminished expenditure of calories is generally slight. There is no excuse for the random use of thyroid hormones in the treatment of obesity. Obese, euthyroid patients will not respond to this therapy. Indiscriminate use of thyroid hormones may be dangerous and the practice must be censured.

NON-TOXIC THYROID ENLARGEMENT

From a therapeutic point of view, non-toxic thyroid enlargement may present a problem. The following factors may influence one's decision:

1. If there are symptoms or signs resulting from *pressure* on neighbouring structures e.g. trachea or oesophagus, surgery is best advised.

2. *Single thyroid nodules* should be removed. In these, at least, the incidence of malignancy is shown to be consistently high.

3. *Diffuse, non-toxic thyroid enlargements*, e.g. 'puberty goitre', should not be removed, unless the gland is very large or for cosmetic reasons. Many of these glands appear to diminish spontaneously; in others, treatment with iodine or thyroid extract (1-3 gr. daily) for several months is followed by decrease in size of the goitre.

4. Major controversy centres around the treatment of *non-toxic multinodular goitres.* The advocates of surgery advise removal because of the danger of malignancy or to forestall the thyrotoxicosis which might develop later, when the patient is older and operation less safe. The opposing view contends that the incidence of malignancy in nodular goitre is small, that the patients rarely suffer ill-effects from the thyroid enlargement, and that indiscriminate surgery will result in thousands of thyroidectomies with no guarantee of benefit. In general, decision may be influenced by the age of the patient (young age favours operation), by the size and character of the gland, and by the ease and expense of the projected operation. In larger centres, the dangers and complications of thyroidectomy are diminishing steadily —a fact which might account for the authors' personal bias in favour of surgery, when this can be done by an experienced thyroid surgeon.

Suid-Afrikaanse Tydskrif vir Geneeskunde
South African Medical Journal

VAN DIE REDAKSIE

HALLUX VALGUS

Daar is baie teorieë wat voorgee om die voorkoms van hallux valgus te verklaar, maar geeneen word tot nog toe algemeen aanvaar nie. Die algemeen-aangenome idee dat ongeskikte skoeisel 'n vername etiologiese faktor is, word deur Barnicot en Hardy,[1] wat valgus-afwykings van meer as 20 grade by kaalvoet inboorlinge van Wes-Afrika gevind het, gekritiseer. Weens die feit dat hallux valgus baie meer algemeen by die vroulike geslag aangetref word, mag dit miskien lyk of die eienaardige skoeisel, wat so dikwels ooreenkomstig die eise van die mode gedra word, hiervoor beskuldig behoort te word. Lake[2] het egter verklaar dat vroeë tekens van valgus-misvorming soms by dogtertjies gevind word op 'n ouderdom waar dieselfde skoene deur beide geslagte gedra word.

Die teorie dat die primêre verskynsel 'n verswakking van die aanhegting van die eerste middelvoetbeen aan die ander is en, as 'n sekondêre uitwerking, dat die groottoon lateraal afwyk en kragtens sy ligament- en spieraanhegtings draai, sal meer ondersteuning geniet. Hierdie begrip van die patogenese van hallux valgus is deur Lake aangevoer en soms word daarna verwys as die ‚atavistiese teorie', aangesien die posisie van die groottoon by hallux valgus veronderstel is om soos die gryptoon van die mensaap te lyk. Lake self meen nie dat die toestand enigsins atavisties is nie, maar dat dit ontstaan as gevolg van die feit dat die toon baie van die primitiewe spier- en ligamentaanhegtings behou het en ‚onder sekere toestande van inspanning mag dit 'n neiging toon om na 'n primitiewer posisie te gaan onder beheer van hierdie aanhegtings'. In 'n onlangse oorsig het Durman[3] die mening onderskryf dat metatarsus primus varus, waarby die eerste middelvoetbeen van die tweede afwyk, die primêre abnormaliteit by die meerderheid van gevalle van hallux valgus is en dat 'n aangebore misvorming van die binneste wigbeen met vermeerderde skuinsheid van die gewrig tussen die wigbeen en die middelvoetbeen òf aanleiding gee tot varus-misvorming van die eerste middelvoetbeen, òf gelyktydig daarmee bestaan. Ander navorsers, veral Haines en McDougall,[4] het ook die aandag op hierdie feite gevestig maar volgens Durman se mening is waarnemings van hierdie soort nie genoegsaam beklemtoon nie en is die belangrikheid daarvan by verbeterende operatiewe behandeling nie ten volle waardeer nie.

Baie operasies is beskryf om die valgus-misvorming reg te maak, maar geeneen het bewys gelewer dat dit heeltemal bevredigend is nie. Lake sê dat ‚die resultate van hedendaagse behandeling oor die algemeen nie so goed is dat verbetering nie verwelkom behoort te word nie'. Daar is algemene ooreenstemming dat die operasie net vir die verligting van simptome gedoen behoort te word en nooit slegs met die

EDITORIAL

HALLUX VALGUS

There are many theories purporting to explain the occurrence of hallux valgus, but none has received general acceptance. The commonly held idea that unsuitable footwear is a major aetiological factor is criticized by Barnicot and Hardy,[1] who have found valgus deviations of more than 20 degrees in barefoot West Africans. The fact that hallux valgus is far commoner in females might appear to incriminate the curious footwear so often worn in obedience to the demands of fashion. Lake,[2] however, has stated that early signs of valgus deformity are sometimes found in female children at an age where the shoes worn are identical in both sexes.

There will be more support for the theory that the primary phenomenon is a weakening of the attachment of the first metatarsal to the others and, as a secondary effect, that the big toe deviates laterally and rotates by virtue of its ligamentous and muscle attachments. This concept of the pathogenesis of hallux valgus was advanced by Lake and is sometimes referred to as the 'atavistic theory' since the position of the big toe in hallux valgus is supposed to resemble the prehensile digit of the anthropoid apes. Lake himself does not consider the condition to be in any way atavistic but to result from the fact that the toe has retained many of the primitive muscular and ligamentous attachments and 'under certain conditions of stress it might show a susceptibility to pass into a more primitive position under the control of these attachments'. Durman[3] in a recent review subscribes to the opinion that metatarsus primus varus, in which the first metatarsal deviates from the second, is the primary abnormality in most cases of hallux valgus, and that a congenital deformity of the medial cuneiform bone with increased obliquity of the cuneo-metatarsal joint either leads to, or co-exists with, the varus deformity of the first metatarsal. Others, notably Haines and McDougall,[4] have also focused attention on these matters, but in Durman's view observations of this nature have been insufficiently stressed, and their significance in corrective operative treatment has not been adequately appreciated.

Many operations have been described to correct the valgus deformity, but none have proved entirely satisfactory. Lake states that 'by and large the results of present-day treatment are not so good that improvement is not to be welcomed'. It is generally agreed that operation should be

idee om die voorkoms van die toon te verbeter nie. By baie gevalle is slegs eksostektomie voldoende om die pyn te verlig. Keller se operasie, waarby die proksimale helfte van die toonbeentjie uitgesny word, is waarskynlik die populêrste hedendaagse metode, en daar word aanspraak gemaak op bevredigende resultate by 'n betreklike groot persentasie gevalle. Die Mayo-operasie, waarby reseksie van die kop en nek van die middelvoetbeen betrokke is met gevolglike verswakking van die boog, is terdeë veroordeel as 'n slegte operasie met niks om dit aan te beveel nie. Operatiewe gewrigsbinding van die gewrig tussen die middelvoetbeen en toonbeentjie is vir baie jare gedoen met afwisselende resultate.

Durman reken dat baie van die slegte resultate van hierdie operasies ontstaan weens die feit dat geen stappe geneem word om die primêre oorsaak van die toestand, wat by baie gevalle die varus-misvorming van die eerste middelvoetbeentjie is, te behandel nie, en hy het 'n operasie beraam om hiermee te handel. Die eerste stap is 'n korrektiewe osteotomie van die nek van die middelvoetbeen volgens die metode van Peabody.[5] Die snit word proksimaal tot die middelpunt van die wigbeen verleng en die basis van die middelvoetbeen gemobiliseer. Na die gewrig tussen die wigbeen en middelvoetbeen oopgemaak is en die eerste middelvoetbeen amper parallel met die tweede geplaas is, word gedeeltes van die gewrigsvlakke verwyder en 'n oorplanting in die voorbereide plek ingesit. Uit 159 gevalle was daar slegs 3 wat by radiologiese ondersoek getoon het dat aansluiting nie plaasgevind het nie, alhoewel dit selfs by hierdie gevalle klinies gelyk het of daar goeie aansluiting was en die pasiënte simptoomloos was. By Lake se operasie word al die strukture wat aan die laterale kant van die basis van die toonbeentjie geheg is, losgemaak en deur middel van 'n nylon- of roesvrye draad, wat deur 'n opening, wat in die kop van die middelvoetbeen geboor is, gesteek word, kry die losgemaakte strukture 'n nuwe aanhegting aan die kop van die middelvoetbeen. Die draad wat deur die opening in die middelvoetbeen gesteek word en aan die mediale kant uitkom, word dan in die basis van die voetbeen vasgeheg.

'n Metode wat ietwat in gemeen het met die Durman-metode is in 1934 deur Lapedus gebruik, en die Lake-operasie is op grootskaal uitgetoets. Dit lyk of die Keller-operasie, indien dit behoorlik gedoen word, in staat is om resultate te lewer wat nie minder bevredigend is as die meer uitvoerige metodes nie, en dit besit die deug dat dit betreklik eenvoudig is om te doen.

1. Barnicot, N. A. en Hardy, R. H. (1955): J. Anat. (Lond.), **89**, 355.
2. Lake, N. D. (1956): Ann. Roy. Coll. Surg. Engl., **19**, 23.
3. Durman, D. C. (1957): Arch. Surg., **74**, 128.
4. Haines, R. W. en McDougall, A. (1954): J. Bone Jt. Surg., **36B**, 272.
5. Peabody, C. W. (1931): *Ibid.*, **13**, 273.

undertaken for the relief of symptoms only, and never merely with the object of improving the appearance of the toe. In many cases exostectomy alone is sufficient to relieve the pain. Keller's operation, in which the proximal half of the phalanx is excised, is probably the most popular present-day procedure, and satisfactory results are claimed in a fairly large proportion of cases. The Mayo operation, which involves resection of the head and neck of the metatarsal, with consequent weakening of the arch, has been roundly condemned as a bad operation with nothing to commend it. Arthrodesis of the metatarso-phalangeal joint has been practised for many years with varying results.

Durman considers that many of the bad results from these operations arise from the fact that no steps are taken to deal with the primary cause of the condition, which in many cases is the varus deformity of the first metatarsal, and he has devised an operation to deal with this. The first step is a corrective osteotomy of the neck of the metatarsal after the method of Peabody.[5] The incision is extended proximally to the mid-point of the cuneiform bone, and the base of the metatarsal mobilized. The cuneo-metatarsal joint having been opened, and the first metatarsal placed almost parallel to the second, portions of the articular surfaces are removed, and a graft is inserted into the prepared bed. In 159 cases there were only 3 instances of non-union as shown by radiographic examination, although even in these cases there seemed clinically to be good union and the patients were asymptomatic. In Lake's operation, all the structures inserted into the base of the phalanx on the lateral side are detached and then, by means of a nylon or stainless-steel suture passed through a tunnel drilled in the metatarsal head, the detached structures gain a fresh attachment to the metatarsal head. The suture leaving the metatarsal tunnel on the medial side is then fixed into the base of the phalanx.

A technique somewhat similar to the Durman procedure was used by Lapedus in 1934, and the Lake operation has been given an extensive trial. It would appear that the Keller operation, properly done, is capable of giving results no less satisfactory than the more elaborate procedures, and has the virtue of being relatively simple to do.

1. Barnicot, N. A. and Hardy, R. H. (1955): J. Anat. (Lond.), **89**, 355.
2. Lake, N. D. (1956): Ann. Roy. Coll. Surg. Engl., **19**, 23.
3. Durman, D. C. (1957): Arch. Surg., **74**, 128.
4. Haines, R. W. and McDougall, A. (1954): J. Bone Jt. Surg., **36B**, 272.
5. Peabody, C. W. (1931): *Ibid.*, **13**, 273.

DISTINGUISHED GUESTS OF CONGRESS

A feature of the South African Medical Congress which is to be held at Durban in September of this year will be the presence and participation of a number of distinguished guests from England, the United States and other countries. Certain of these, particularly visiting surgeons and anaesthetists, will be asked to demonstrate their techniques to Congress members and other practitioners or students, and it is likely, as has happened with visiting specialists on other occasions, that practitioners may ask some of our guests to see special cases. These visiting members of Congress, not being registered under the Medical, Dental and Pharmacy Act of the Union, will naturally not have the

rights which that Act confers on registered persons, and it is important that our members should take care not to expose our guests to the embarrassment they might suffer if they were asked to perform acts which they are not legally empowered to perform.

Under section 74 of the Act the Minister of Health after consulting the South African Medical and Dental Council may exempt from the registration requirements of the Act for a prescribed period any visitor who is engaged *inter alia* in demonstrating medical, surgical, dental or pharmaceutical techniques. Such exemption has been applied for in respect of some of our visitors and will cover the proposed demonstrations. The Act does not, however, give power to exempt from the registration requirements of the Act as regards consultations.

The provision of the Act which South African practitioners must take care not to ask our visitors to contravene is contained in section 34 (1) (*a*), as follows: 'Any person not registered as a medical practitioner or as an intern who, for gain, practises as a medical practitioner or intern (whether or not purporting to be registered) or performs any act specially pertaining to the calling of a medical practitioner shall be guilty of an offence . . . ' It appears that the acceptance of a fee ('for gain') is an essential part of this particular offence. There are also other actions which the Act forbids unregistered persons to perform, e.g. the issuing of 'medical' certificates or other documents.

Under section 24 of the Act as amended, provision is made for the temporary registration of a person who has come or intends to come to the Union at the request of a registered medical practitioner to examine or treat an individual patient. A person registered under this provision is not authorized to examine or treat any other than the specified patient 'and such other patients as he may specifically be authorized by the Council to examine or treat'. It is not known whether registration will be applied for by or on behalf of any of our guests under this or any other provision of the Act.

It is well that doctors in South Africa should appreciate the position of members of Congress who have come from abroad *vis-à-vis* the laws of the Union concerning medical registration and practice.

DIAGNOSIS AND TREATMENT OF ABDOMINAL ANEURYSMS

WITH SPECIAL REFERENCE TO RESECTION AND GRAFTING

ROBERT H. GOETZ, M.B., CH.B. (CAPE TOWN), M.D. (FRANKFURT), M.D. (BERNE)
Associate Professor of Surgical Research

J. H. LOUW, CH.M. (CAPE TOWN)
Professor of Surgery

A. B. BULL, M.B., CH.B. (CAPE TOWN), D.A. (R.C.P. & S.I.)
Senior Lecturer in Anaesthesia

From the Department of Surgery, University of Cape Town, and the Vascular Investigation Service, Groote Schuur Hospital, Cape Town

The treatment of aneurysms has shared in the rapid advances in cardiovascular surgery which have taken place within recent years. Aneurysms of the abdominal aorta can now be treated successfully by surgical means and excision with grafting has been firmly established as the treatment of choice. Early and accurate diagnosis has therefore become of great importance.

At Groote Schuur Hospital 140 aneurysms have been seen at the Vascular Investigation Service since 1950, 28 of which were cases of abdominal aneurysms seen since 1953 (Table I). This number does not include all aortic aneurysms seen by all members of the hospital staff, for in the past cases were rarely referred to the surgical wards because no treatment could be offered. Now that a beginning has been made with excision and grafting of abdominal aneurysms more patients are being seen by us, and no less than 16 patients with abdominal aneurysms have been referred to the clinic since 1956.

Incidence

Judging by necropsy reports, the incidence of abdominal aneurysms varies between 0·1 and 0·5%.[1-3] Related to the general increase in life expectancy in recent years, there has been an increased incidence of arteriosclerotic aneurysms, whereas syphilis has lost in importance as a cause.[4] The incidence of abdominal aneurysms is said to have a geographic distribution which, no doubt, is a reflection of the varying incidence of arteriosclerosis in different racial and social groups. It is thus of interest that out of 28 cases seen since 1953 only 3 were in Cape Coloured patients, none in Africans and 25 in Europeans. Males are affected at least 10 times as frequently as females.

Etiology and Pathology

Abdominal aneurysms are almost exclusively arteriosclerotic in origin in contrast to aneurysms of the thoracic aorta, which are still mainly caused by syphilis.[5, 6] Thus of 142 arteriosclerotic aortic aneurysms studied by Blakemore,[7] 114 affected the abdominal aorta, and all but one of 102 aneurysms collected by Estes[8] were due to arteriosclerosis. Amongst other and rarer causes may be mentioned tuberculosis, streptococcal infection, rheumatic fever, periarteritis nodosa, and neighbouring disease with secondary injury to the aortic wall.

Arteriosclerotic aneurysms develop almost invariably in the aorta distal to the origin of the renal arteries. The reason

TABLE I. ANEURYSMS SEEN IN THE VASCULAR INVESTIGATION SERVICE AT GROOTE SCHUUR HOSPITAL. THE ANEURYSMS OF THE ABDOMINAL AORTA HAVE BEEN SEEN SINCE 1953, ALL OTHERS SINCE 1950

	Vessel Involved	Total	Aneurysms				Arterio-venous Fistulas	
			Traumatic	Arterio-sclerotic	Syphilitic	Mycotic	Congenital	Traumatic
	Total	140	15	54	23	10	25	13
	Pulmonary	7	—	—	—	1	5	1
Aorta and Branches	Ascending	—	—	—	8	—	—	—
	Thoracic	12	—	2		1	—	1
	Innominate	7	—	—	7	—	—	—
	Carotid	3	2	—	—	—	—	1
	Abdominal	28	—	27	1	—	—	—
Lower Limbs	Iliac	8	—	4	2	1	—	1
	Femoral	27	3	6	2	3	10	3
	Popliteal	20	3	13	2	1		1
	Tibials	3	—	—	1	1	—	1
Upper Extremity	Subclavian	2	—	—	—	2	—	—
	Brachial	3	1	—	—	—	2	—
	Radial, Ulnar	2	2	—	—	—		—
	Digital	3	—	—	—	—	3	—
Head	Temporal	12	3	—	—	—	5	4
	Auricular		—	—	—	—		
	Miscellaneous	3	1	2	—	—	—	—

for this predilection has never been satisfactorily explained, but we consider that sudden haemodynamic changes which take place at this point are responsible. These changes are produced by two factors, viz. (1) the large amount of blood drained by the renal vessels, and (2) the relatively slow run-off *via* the iliac arteries. These result in a difference in the velocity of the blood flow above and below the origin of the renal vessels and consequently an appreciable increase in the lateral pressure where the transition takes place, i.e. just beyond the renal vessels (Figure 1). For similar reasons an aneurysmal dilatation is found in cases of patent ductus[9] just distal to the ductus (Fig. 2).

Arteriosclerotic aneurysms are fusiform rather than saccular and in the beginning the aortic wall forms an integral part of the aneurysm. In a large percentage of cases the common iliacs take part in the pathology, exhibiting fusiform dilatation or frank aneurysms (Fig. 11). In fact, coexisting aneurysms are not rare, affecting usually the popliteal artery and thoracic aorta.

Rupture commonly takes place into the retroperitoneal tissues but occasionally into the peritoneal cavity or into the bowel (duodenum).

Clinical Features

Aneurysms of the abdominal aorta are notorius for their silence. In 12 out of our 27 arteriosclerotic patients the discovery of an aneurysm was an incidental finding during examination for other unrelated complaints or for peripheral arterial disease. In about one-third of the cases the patients themselves discovered a throbbing or pulsating abdominal mass. The commonest presenting symptom is a sense of fullness and pain. The pain is described as throbbing, piercing, boring or excruciating. It is usually due to either leaking into the retroperitoneal space or intermittent attacks of hydronephrosis. It is commonly located in the lumbar region and radiates into the groin or into one leg. Abdominal aneurysms, therefore, commonly masquerade as surgical renal disease (Fig. 3).

According to Linton[10] severe back pain invariably indicates leakage or rupture into the retroperitoneum. Only a small percentage of cases present when the aneurysm has actually ruptured and only 3 of our cases were admitted as ruptured aneurysms.

In the syphilitic variety, pain is commonly radicular in type due to erosion of the vertebrae and interference with nerve roots.

Occasionally the first symptoms may be referred to the gastrointestinal tract, e.g. dyspepsia, constipation, symptoms of obstruction, anorexia and loss of weight (Fig. 4).

The *physical findings* will naturally depend upon the size, the situation, and particularly the presence of complications. An expansile, pulsating mass in the region of the umbilicus

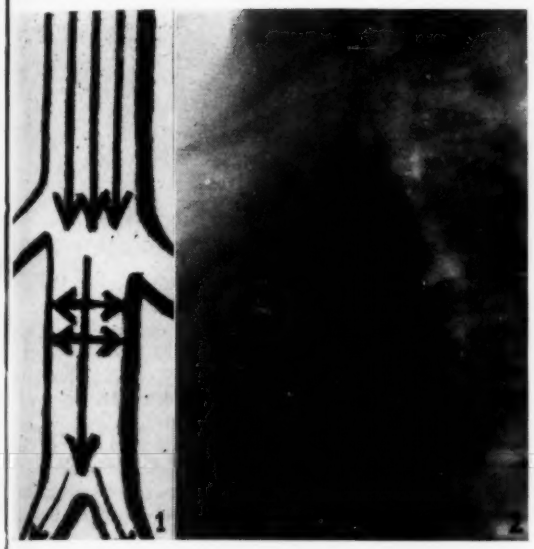


Fig. 1. Diagram of mechanism leading to aneurysms below the renal arteries. For explanation see text.

Fig. 2. Aneurysmal dilatation in the thoracic aorta distal to the origin of a patent ductus arteriosus. For explanation see text. From Goetz *et al.*[9] by courtesy of the Editor of *Angiology*.

may be felt by the patient himself and a thrill and bruit may be elicited on examination. Owing to the marked unfolding of the aorta preceding or accompanying the formation of the aneurysm, the mass is often extremely superficial and surprisingly dextroposed. Thus the inferior vena cava or the right common iliac vein may become compressed, resulting in dependent oedema (Fig. 5). The pounding of the extending aneurysm may produce complete destruction of the sympathetic chain and 3 of our cases

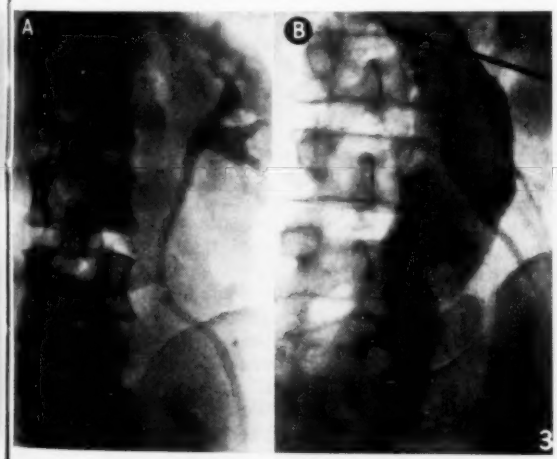


Fig. 3. Lateral displacement of ureters by abdominal aneurysms. Note that in (B) the displacement does not follow the outline of the axial stream in the aortogram owing to the large clot attached to the wall of the aneurysm.

Fig. 4. Barium enema in a case who presented with intermittent attacks of intestinal obstruction and an aneurysm was found on examination.

Fig. 5. Oedema of the right foot due to obstruction of the right common iliac vein by a large dextroposed aneurysm (same case as in Fig. 13B). Oedema disappeared after resection.

presented a warm dry leg which, on examination, proved to be completely sympathectomized (Fig. 6).

The mass may be felt in the epigastrium or left upper quadrant, suggesting a much higher or different origin, yet aortography usually proves that it arises below the renal vessels. Although pulsations can usually be felt over a wide area of the abdomen, large aneurysms filled with laminated

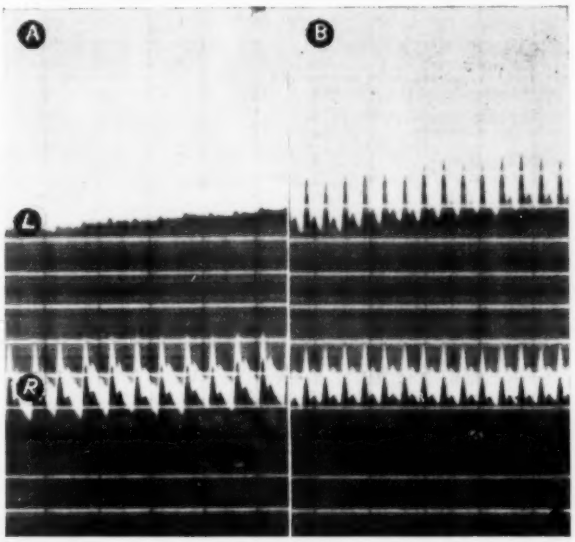


Fig. 6. Plethysmograms obtained in a case of abdominal aneurysm who presented with a warm, dry, right limb. Note the difference in the height of the pulse volume between the two limbs at rest (A). The pulse volume in the left leg shows the normal improvement on reflex heating (B). On the right, however, the pulse volume decreases, as is typical in the sympathectomised limb,[39] owing to shunting of blood into the opposite limb.

clot will pulsate considerably less and the thrill and murmur may not be as distinct as expected.

Signs of arteriosclerosis elsewhere (coronary artery and cerebro-vascular disease) can be elicited in almost all cases. However, in the majority of cases it is the Mönkeberg type of sclerosis of the media which is encountered rather than occluding atherosclerosis. Thus only a small percentage of cases present with claudication.

Rupture. As a rule, rupture of the aneurysm produces sudden, severe abdominal pain, which is agonising, piercing, and tearing in character and commonly referred to the legs. The patient often rolls in bed and cries out in agony. *Occasionally, however, pain may be minimal. The abdomen is at first tender and rigid, but this diminishes with the onset of ileus.* With the increasing loss of blood there follows collapse with a rapid pulse rate, a drop in blood pressure and pallor.

Aortography

Aortography is not essential for the diagnosis *per se*. Indeed, because of the clot lining the aneurysmal wall,

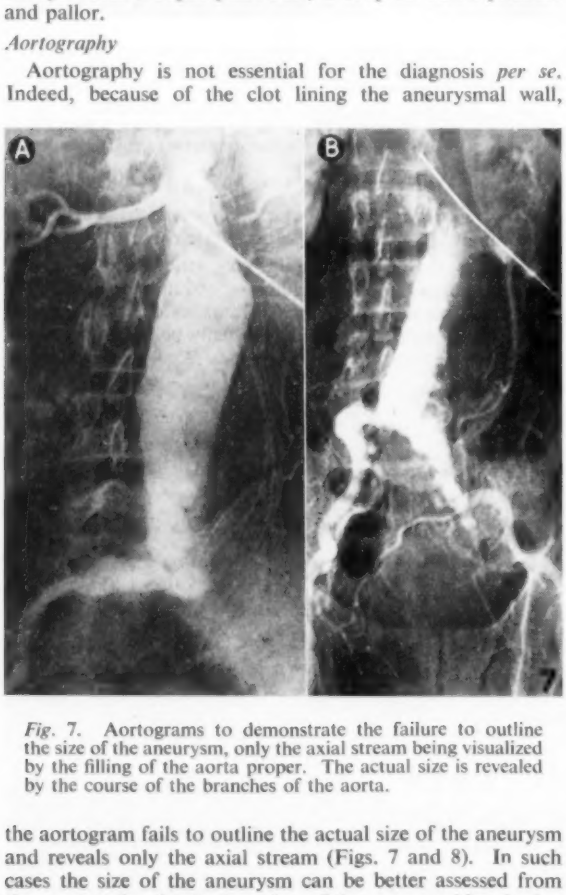


Fig. 7. Aortograms to demonstrate the failure to outline the size of the aneurysm, only the axial stream being visualized by the filling of the aorta proper. The actual size is revealed by the course of the branches of the aorta.

the aortogram fails to outline the actual size of the aneurysm and reveals only the axial stream (Figs. 7 and 8). In such cases the size of the aneurysm can be better assessed from the course taken by the branches of the aorta, and by viewing the straight X-ray and aortogram side by side. The chief value of the aortogram in the established case lies in the visualization of the aorta above the aneurysm and the iliac vessels below, which are important considerations when planning reconstructive surgery. Both the size and length of the prosthesis required to replace the aneurysm can be assessed from the aortogram. Aortography is also of great

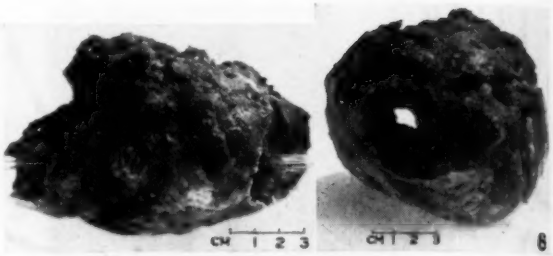


Fig. 8. Large clot removed from aortic aneurysm. Note the axial stream.

value in cases where simple unfolding of the aorta simulates aneurysmal dilatation. Occasionally an emergency aortogram may be required to establish a diagnosis of ruptured aneurysm (*vide infra*).

We prefer direct translumbar aortography to retrograde (femoral) catherization, and have found that this is best done under lumbar epidural anaesthesia. According to the diagnostic problem, the aorta is injected above or below the renal arteries, i.e. the needle is introduced opposite the 1st or 3rd lumbar spine. (It may be mentioned at this point that complications are almost limited to injections at the higher level.) The needle is introduced through a small stab wound in the skin fully 10-12 cm. from the mid-line at an angle of about 60° with the sagittal plane and advanced until it strikes the transverse process. It is then passed cranial to the transverse process until it makes contact with the vertebral body, which is passed. As the needle pierces the vertebral fascia a resistance is felt which can be differentiated from that offered by the aorta through the absence of a systolic thrust.

When the aorta has been located, it is pierced. This is distinctly felt, as if entering an empty space. The needle is advanced until the tip comes to lie about 1 cm. within its lumen. This is checked by the introduction of a blunt stylet to find the opposite wall of the aorta.

The position of the needle tip should be checked by the injection of a test dose of 5 c.c. of the dye. This is necessary to ensure that the whole volume of dye will not be injected directly into any of the branches of the aorta.

20 c.c. of 70% Diodrast are injected as rapidly as possible by hand. Three films are taken by means of a simple casette changer, the first during the injection after 10 c.c. have been injected and the following in rapid succession.

Many serious complications of aortography have been reported and consequently the indications for the procedure are still under discussion. We have been fortunate in that we have encountered none of these complications and have not hesitated to carry out the procedure even in the presence of rupture. We now use a Dos Santos needle with lateral openings, small amounts of dye and no pressure apparatus, and by approaching the aorta from the flank fully 10-12 cm. from the mid-line, we try to avoid striking the aorta tangentially which, in our opinion, is one of the major causes of dissection complicating aortography.

Laboratory Findings

These are of little value in diagnosis. Even if positive serological tests for syphilis are found, they do not assist

materially. On the other hand, careful assessment of the patient from the point of view of the operative and anaesthetic risk is essential. Only where immediate surgery is indicated, as with ruptured aneurysm, is it permissible to dispense with any of the usual routine pre-operative investigations such as blood count, haemoglobin estimation, serum proteins, blood sugar, plasma electrolytes and renal and hepatic function. Even with ruptured aneurysms only those investigations which might be time-consuming or reveal a state of affairs which would take longer to correct than the severity of the rupture would permit, may be omitted.

Differential Diagnosis

Uncomplicated abdominal aneurysms may have to be differentiated from other cyst-like masses in the abdomen. Amongst these, lymphosarcoma and renal tumours are the most important. The aneurysm may not involve the aorta itself, but one of its branches, such as the superior mesenteric artery, as in one of our cases.

The differentiation between transmitted and expansile pulsations may be difficult, particularly when pulsation is minimal. The diagnosis in such cases is greatly assisted by a straight X-ray, and if necessary, an aortogram.

Great difficulty often arises from a superficial slightly unfolded aorta in a thin or relaxed patient with a certain degree of lordosis, when aortography is once more of great value.

Once complications have arisen, the differential diagnosis involves many surgical and medical conditions. By far the commonest and most serious of complications is rupture. It may occur in a completely symptomless aneurysm. Its diagnosis may be particularly difficult if the patient is in a collapsed state when first seen, because at this stage the abdominal mass, although palpable, may not pulsate. In such cases the condition is often attributed to renal colic, coronary thrombosis, rupture of an abdominal viscus, or other causes of internal haemorrhage. One of our cases, who was known to have an abdominal aneurysm, presented later with a massive rupture and the diagnosis was still so difficult that an emergency aortogram was done to demonstrate the leakage.

It is important not to lose sight of the fact that the discovery of an aneurysm does not necessarily indicate that it is the cause of the patients' symptoms.

Prognosis

It is difficult to give an exact prognosis in the individual case. Whether diagnosed by accident or from symptoms, the aneurysm has probably been present for some considerable time. It is generally agreed that about one-third of all cases do not survive the first year following the diagnosis.[8] The following figures are taken from an analysis of 102 cases (average age 65 years) published by Estes:[9] Only 10% of these patients with abdominal aneurysms survived 8 years, whereas 65% of normal persons at this age have a life expectancy of this duration. Of the traced patients, two-thirds survived 1 year or longer following the diagnosis, one-half survived 3 years and only 18·9% were alive after 5 years (Fig. 9). Rupture of the aneurysm caused the death of 57% of cases. In 6 patients who exhibited signs of leakage at the time of diagnosis the survival period was considerably shorter than that of the whole series.

These figures more than justify the more radical and direct

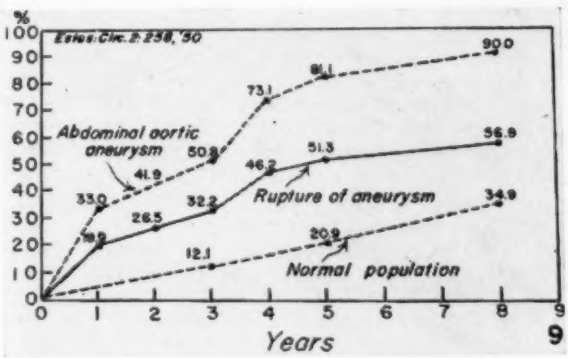


Fig. 9. Death rate from abdominal aortic aneurysms compared with normal life expectancy of patients of the same age-group; from Estes,[9] by courtesy of the Editor of *Circulation.*

surgical approach now generally adopted in the treatment of abdominal aneurysms. The fact that individual patients may have lived for longer periods than those indicated above does not detract from the fact that the prognosis is comparable to many forms of cancer.

Contrary to general belief, the patient may not die immediately from the haemorrhage following rupture, but may live for 3-4 days.[11] Thus there is time in many cases for surgical intervention. Many patients who survive the immediate effects of internal haemorrhage manifest a lucid interval of several hours[31] before finally deteriorating. Out of 15 cases of ruptured aneurysm collected by Goldowsky[32] 12 survived more than 24 hours, 8 more than 5 days.

TREATMENT

It is the seriousness of the complications in particular and the poor prognosis of abdominal aneurysms in general which demand action in order to avoid sudden disaster. Evidence of leakage is an absolute indication for urgent operation. Emergency resection and grafting can be performed successfully even in the presence of extensive recent retroperitoneal haemorrhage and one of our patients was still bleeding actively when operated upon. Unfortunately, many of the patients are poor surgical risks with other evidence of vascular degeneration, such as coronary artery disease, hypertension and generalized vascular disease. It may therefore be difficult to decide about operative intervention in patients with symptomless aneurysms found on routine examination. It must be remembered, however, that operation is infinitely more difficult, hazardous and time-consuming once leakage and rupture have occurred. Since time is an all-important factor because of the risks of prolonged ischaemia, we are inclined to recommend surgical treatment before these complications have occurred. Increase in size of the aneurysm and progression of symptoms often herald leakage or rupture and must be regarded as clear indications for surgery.

The treatment of aneurysms belongs to the oldest and most spectacular medico-surgical endeavours. In his book *Des anévrysmes et de leur traitement* published in 1856, Paul Broca,[14] the famous French surgeon, devoted fully 700 pages to the treatment of aneurysms and he lists 22

different methods of treatment. Compared with his account the treatment of aneurysms has indeed become very simple today. We do not intend to discuss the multitude of procedures which in years gone by have been tried. They include ligation and other encircling constrictive devices,[15, 16] procedures directed towards strengthening the wall of the aneurysm by reinforcing or fibrosing agents,[17-21] deliberate promotion of thrombosis in the aneurysmal sac by means of wiring,[10, 22] and thrombo-endarteriectomy.[22]

Modern treatment aims at reconstitution of the arterial pathway by surgical means, achieved either by lateral aortorrhaphy,[23] as with the saccular aneurysms, or by excision and replacement as with diffuse arteriosclerotic aneurysms.[24-26]

The original workers used aortic homografts,[36] but since Blakemore *et al.*[29] have demonstrated that aortic defects may be bridged by grafts made of non-biological material a large number of plastics such as Orlon, Dacron, Nylon, Teflon and Ivalon has been tried by various surgeons.[24-26] We have relied entirely on grafts made of polyvinyl sponge and Nylon net, the safety of which we had established in animal experiments.[30] It is now abundantly clear that it is technically possible to replace any part of the aorta by a graft. The limiting factor is the time required for inserting the graft, because the aortic blood flow must be temporarily arrested and various organs may be temporarily deprived of their blood supply while the anastomosis is being performed. The main organs concerned are the spinal cord and the kidneys and, to a lesser degree, the liver and the intestines. The time depends on many factors, of which the level of the occlusions and the development of the collateral circulation are all-important.

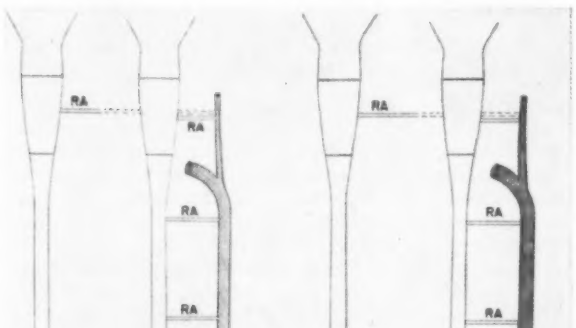


Fig. 10. Blood supply of spinal cord and the effect of infra- and supra-renal clamping at (A); from Adams and van Geertruyden,[34] by courtesy of the Editor of *Ann. Surg.* Area of cord interfered with is shown in black. Note two types of blood supply.

The renal arteries constitute the critical level. Damage to the spinal cord is uncommon during infra-renal aortic surgery, because the cord usually receives no branches from the aorta below that level and, even when it does, interruption does little harm, because the collateral supply from the important low thoracic spinal vessel is constant. Subrenal clamping of the aorta is thus possible for long periods.

Supra-renal aortic procedures are in a different class. If the radicular arteries from the 8th to the 12th thoracic segment are sacrificed there is a distinct possibility of spinal cord damage.[34] Therefore a lesion in the lower thoracic aorta can be resected with safety only if the arteria radicularis magna arises from the abdominal aorta (Fig. 10). The exact safe period is not yet known and varies in various individuals. Whereas a 10-minute interruption has lead to paraplegia in some patients, clamping of the aorta for 50 minutes has not caused any damage in others.[35] The fact that the safe period of clamping cannot be determined pre-operatively in the individual patient is very disturbing.

Various ways of overcoming the impasse have been employed, e.g. minimizing the period of aortic arrest, by-passing or shunting operations prior to aortic clamping, and using hypothermia (27-28°C) to reduce the oxygen requirements of the individual organs.

Our own experience has been limited to infrarenal aortic resections with replacement by non-biological grafts made of polyvinyl alcohol sponge (Ivalon)[30]. The following description of the technique of resection and grafting is based on our observations made during many animal experiments, operations performed by us on 4 cases at Groote Schuur Hospital, and assistance (by one of us) at operations on 3 other cases. In all cases the aneurysm, including the bifurcation of the aorta, was resected. One of our cases, successfully operated upon as an emergency at Groote Schuur Hospital, presented with acute collapse due to a ruptured aneurysm and massive retroperitoneal haemorrhage.

TECHNIQUE OF RESECTION OF INFRARENAL AORTIC ANEURYSMS

Pre-operative Preparation and Anaesthetic Management

Careful pre-operative preparation on the same lines as for any major operation is essential. These patients have to be subjected to prolonged anaesthesia with more than the usual hazards of traumatic shock and blood loss which accompany major surgery. It is therefore essential that they should be presented in the best possible condition.

We have taken the precaution of preparing the large bowel with Sulfathaladine and Neomycin in case ligation of the inferior mesenteric artery should jeopardize the viability of the pelvic colon and necessitate resection.

From the anaesthetist's point of view the management of the case during surgery may be divided into two sections:

1. *Respiratory and Relaxation.* As the operation is likely to last several hours, anaesthetic agents with minimal toxicity must be chosen. Induction with minimal amounts of Thiopentone has been most satisfactory, and this is followed by maintenance of anaesthesia with nitrous oxide and oxygen supplemented with no more than 2-3% of ether vapour. This is preferred to pethidine because it is felt that in this way post-operative respiratory depression, which is to be rigidly avoided, is possibly less. Relaxation is provided with d-tubocurarine chloride and ventilation maintained *via* a cuffed endotracheal tube with the use of CO_2-absorption technique. The necessity for adequate ventilation throughout operation cannot be overemphasized; it is important

in preventing respiratory acidosis.[40] A degree of overventilation reduces the amount of relaxant required.

2. *Circulatory.* Severe circulatory disturbances are likely to be encountered. These can be divided into (*a*) those due to loss of blood and (*b*) those due to the major interruption of circulation to the lower part of the body as a result of clamping of the aorta: (*a*) The blood loss may be severe, and replacement must be designed to compensate for normal operative loss, which we have found to be approximately 1 pint per hour after the first hour. This is roughly constant for all prolonged major surgery. In addition, during aortic reconstruction it may be necessary to deal with episodes of rapid loss of blood which may occur during exposure of the aneurysm and particularly on release of the aortic clamp at the end of anastomosis, when bleeding from the graft or minor imperfections in the suture line may be brisk. It is therefore essential to have facilities for rapid transfusion ready. To this end our practice is to have ready two intravenous channels, which of course must not be in the legs. Two 15-gauge needles in convenient arm veins have been found adequate to allow of a sufficient rate of transfusion by gravity, but facilities for pressure transfusion must be at hand. (*b*) Circulatory changes resulting from clamping of the aorta are dealt with below.

Posture. The normal supine position is adopted, with facilities for Trendelenburg and lateral tilting of the table if required. Inflatable sphygmomanometer cuffs are put around the thighs for use during the course of the operation. The cuffs may be attached to a common inflating bulb by means of a T piece, but we prefer to keep them independent.

Incision and Approach

We have used the transperitoneal approach in all our cases. The abdomen is opened through a mid-line or left paramedian incision extending from xiphisternum to pubis. As always, adequate exposure is the keynote to success.

In leaking aneurysms, free blood may be present in the peritoneal cavity, but the main evidence of leakage is the presence of a retroperitoneal haematoma. This may be most extensive; for instance, in one of our patients the extraperitoneal blood had extended around the flanks as far as the mid-line anteriorly in the hypogastrium.

The aneurysm is visualized by lifting the transverse colon forwards and upwards and exteriorizing the whole of the small bowel on the right side of the patient, where it is best protected by being placed in a plastic bag. Inspection and palpation reveal the extent of the aneurysm and of associated retroperitoneal haematoma. The site of leakage is often indicated by 'bruising' of the overlying peritoneum. Unless there has been a severe fall of blood pressure as the result of recent haemorrhage or of the anaesthesia, pulsations in the aneurysm are vigorous.

The relationship of the aneurysm to the main branches of the aorta must be determined at this stage if possible. The *renal arteries* are the most important. In the majority of cases the aneurysm arises below these arteries, leaving 1-3 cm. of 'normal' aorta between its proximal limit and the vessels. (Encroachment on the renal arteries and even on the superior mesenteric and coeliac axis does not preclude excision, but requires a different approach and calls for hypothermia). The common *iliac arteries* are frequently 'taken up' by aneurysms in this site (Fig. 11), in which case resection of the aortic bifurcation becomes imperative. When the dilatation extends far enough to include the bifurcation of the common iliacs and, at the same time, the distal vessels are grossly arteriosclerotic, resection may not be feasible. The *inferior mesenteric artery* arises from the left anterior aspect of the aneurysm and is not infrequently thrombosed.

The presence of a large and recent 'dissecting' or pulsating retroperitoneal haematoma may render accurate assessment of the relationship of the aneurysm to the renal arteries impossible. It may not even be possible to identify the normal aorta proximal to the aneurysm at this stage, and in such cases a pre-operative aortogram is of the greatest help.

Exposure and Control of the Proximal Aorta and Iliac Vessels

This step is essential for control of bleeding during subsequent mobilization of the aneurysm.

The posterior parietal peritoneum overlying the left border of the aneurysm is incised longitudinally and the incision is extended upwards towards the origin of the transverse mesocolon along the lateral aspect of the fourth part of the duodenum.

Fig. 11. Bifurcation of the aorta and iliac arteries in 6 cases of aneurysms which have been resected showing the extension of the pathological changes to include the iliac vessels. Aortograms of cases 4 and 5 were performed after rupture. Both were resected and have done well.

It is continued as far as the duodenojejunal flexure, where the ligament of Treitz is divided.

The duodenum and root of the mesentery are mobilized towards the right to expose the aorta crossed by the left renal vein.

The aorta just distal to the renal vessels is freed from surrounding structures and haematoma mainly by careful, blunt finger dissection until it can be completely surrounded by an umbilical-tape tourniquet. Once this has been done further mobilization of the aorta between aneurysm and renal vessels can be undertaken with greater safety. During this dissection great care must be taken to avoid injury to the inferior vena cava, left renal vein and lumbar vessels. Haemostasis must be absolute, and all small venous tributaries have to be coagulated or ligated. When this segment of aorta has been mobilized it is ready for application of a Brock's auricular clamp, which is put in position but not clamped.

Attention is now directed to the bifurcation of the aorta and iliac vessels. The common iliacs (or the internal and external branches in cases where the common trunk is involved in the aneurysm) are exposed by division of the peritoneum. The vessels

are dissected free from surrounding structures for a distance of 2-4 cm., particular care being taken to keep the ureters out of harm's way. On the right side great care must be taken not to injure the left iliac vein as it passes behind the artery, and on both sides it is most important to preserve the accompanying main veins. When the arteries have been adequately mobilized, tape tourniquets are passed around them for control of haemorrhage during the subsequent mobilization of the aneurysm.

Exposure and Mobilization of the Aneurysm

The peritoneal incision over the left common iliac artery is extended upwards along the left border of the aneurysm and medial to the inferior mesenteric vein to meet the incision over the exposed normal aorta proximal to the aneurysm.

The inferior mesenteric artery is tied and divided close to its origin from the aneurysm. As a result, the pelvic colon will depend on the marginal artery for its blood supply. This vessel is usually well developed because of prior insidious thrombosis of the inferior mesenteric, but in cases where the latter artery is still patent the ligation may seriously jeopardize the viability of the colon. Moreover, an acute leakage with extensive spread and peritoneal 'stripping' towards the left iliac fossa may embarrass the marginal blood supply and lead to colonic necrosis even in cases where the inferior mesenteric has been thrombosed. It is therefore most important to assess the viability of the colon at this stage and towards the end of the operation. (One of our patients developed mucosal sloughing and perforation of the colon 10 days post-operatively.)

The left lateral aspect of the aneurysm is dissected free from neighbouring structures, particularly the inferior mesenteric vein, the gonadal vessels and the left ureter. The inferior mesenteric vein may be thrombosed and the testicular (or ovarian) vessels may be so firmly embedded in the surrounding haematoma that they have to be sacrificed. The left ureter is often displaced laterally and may be incorporated in the wall of the sac.

By careful rotation of the aneurysm towards the right, the left lumbar and iliolumbar vessels can be visualized. They must be tied and divided, for diathermy coagulation is unsafe.

The peritoneum overlying the aneurysm is reflected to the right but, if it is firmly adherent to the sac, the peritoneum along the right border of the aneurysm is incised. This exposes the right lateral aspect of the aneurysm and the inferior vena cava. The wall of the sac is often firmly adherent to the vena cava and great care must be exercised in separating these structures by blunt dissection. If such separation would entail unnecessary trauma to the vena cava, it is wiser to leave the adherent portion of the aneurysm attached to the vein.

At this stage mobilization of the aneurysm is practically complete, unless it has burrowed into the psoas muscle or eroded vertebrae. However, it is still tethered by the right lumbar and iliolumbar arteries and these are more safely divided at a later stage.

Resection of the Aneurysm

Occlusion of the aorta is deliberately deferred to this stage because of the risks of prolonged ischaemia of the lower limbs and spinal cord. Also, the strong pulsations of the artery under an arterial clamp may be harmful to its diseased lining, and profound changes in blood pressure may occur during clamping and after release of the aorta. Occlusion may be expected to give a rise in blood pressure, but it is of interest to note that in 2 of our cases this expected rise did not occur. In one of them there was a sharp drop in pressure of some 60 mm. Hg when the aortic clamp was tightened. The pressure remained down until release of the clamp, when a steady rise occurred. In the other, a steady fall of blood pressure occurred throughout the preliminary exposure and mobilization, with a transient rise of only 10 mm. Hg when the aortic clamp was tightened. This patient did not survive, and autopsy revealed extensive arteriosclerosis of his coronary arteries. Our other cases showed the expected sharp rise in blood pressure of some 40 mm. Hg on tightening of the clamp.

The clamp around the aorta is used to occlude the artery as close to the renal arteries as possible, care being taken to keep the left renal vein out of the way. It is important to use very light clamps on the iliac vessels because too strong an instrument may dislodge or transect the inner layer, loose flaps of which may occlude the lumen subsequently. We have used small Blalock's clamps or relied entirely on the tape tourniquet, although the latter usually cannot occlude the hardened arteries completely.

The aneurysm may be resected from above downwards or from below upwards according to circumstances. The aorta and iliac vessels are divided close to the aneurysm and the stumps inspected. These are usually markedly diseased. The temptation to go on trimming the edges back in the hope of finding something better must be resisted as soon as an adequate lumen is found, even if the sutures will have to pass through a plaque of atheroma. The iliac vessels are often partially occluded by organized thrombus and atheroma, which tends to flake off and should be removed. In such cases it is a wise precaution to suture the loosened intima to the outer coats to prevent subsequent dissection.

After the iliac vessels have been divided, the Blalock clamps are temporarily released to estimate the amount of return flow *via* collaterals and to inject 20 ml. of heparin (5,000 units per 100 ml.) into each side.

The aneurysmal sac is now carefully lifted forwards and severed from its remaining connections. During this dissection great care must be exercised not to injure the right lumbar and iliolumbar and the middle sacral vessels, which are tied and divided. In difficult cases it may be necessary to open and evacuate the sac to facilitate its removal, although this is associated with troublesome backflow of blood from the lumbar arteries. Firm adhesion to the inferior vena cava or penetration into muscles and vertebrae may render complete removal of the aneurysm impossible, in which case the affected portion of the adventitia should be left *in situ* (artheromatous plaques, etc. must be pealed off). In such cases it might not be possible to isolate the neighbouring lumbar arteries, and bleeding is controlled by suturing the orifices of the arteries where they enter the adherent portion of the aneurysmal wall.

Preparation of the Graft

We have been using grafts made from polyvinyl sponge and nylon net. The prosthesis is prepared by the method described in detail elsewhere[30] according to the measurements available from the pre-operative aortogram. As a rule, the prosthesis is prepared the day before the operation and removed from its mould just before its insertion. In the case of the ruptured aneurysm the graft had to be prepared in the theatre during the operation.

Insertion of the Graft

The more difficult lower anastomoses are performed first. It is a great advantage to be able to manipulate the graft freely during these anastomoses. Also, a large polythene tube can be threaded through the graft and into the iliac vessels to prevent undue narrowing of the lumen when the sutures are inserted.

The left iliac is done first. The arterial stump is cleared of redundant adventitia. A pair of stay sutures, tied on the outside, are placed on opposite sides of the anastomosis and a small quantity of dilute heparin solution is placed within the lumen of the left limb of the graft and open end of the corresponding vessel. The posterior half of the anastomotic suture is then inserted; a simple continuous running suture of 000 arterial silk is used, lubricated with sterile paraffin. The ends of this suture are tied to the stay sutures and successive 'bites' are placed 1-2 mm. apart. No attempt is made at eversion, but all knots are placed on the outside. We have taken the precaution of reinforcing this layer with a second continuous suture of 00000 silk to produce a criss-cross effect, which ensures accurate apposition and close approximation.

The Blalock clamp is then removed and a lubricated polythene tube as wide as the lumen of the artery is threaded through the graft and over the completed posterior anastomotic layer into the artery. Gentle suction through this tube serves to remove blood flowing back from collaterals and keeps the field dry. The anterior layer is then anastomosed in a similar manner, with the use of two continuous arterial sutures. After completion, 20 ml. of heparinized saline are injected into the iliac artery and the artery clamped.

The procedure is then repeated on the right side.

The graft must be cut to length before commencing the upper aortic anastomosis. It is important to insert the graft under sufficient tension to ensure that there will be no redundancy when the blood flows through it. It is therefore cut at least 10%

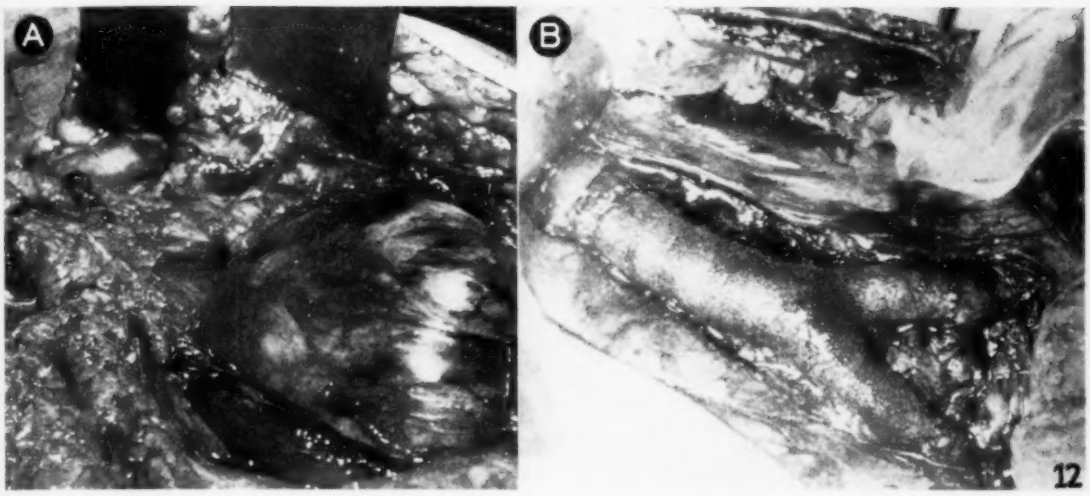


Fig. 12. Resection of abdominal aneurysm and replacement by a Y-shaped Ivalon-Nylon net graft. (A) the aneurysm exposed. (B) graft in place, all clamps removed. Note the suture lines both at the aortic and iliac ends.

shorter than the gap to be bridged. On account of this, it may be necessary to apply a soft clamp on the graft itself to help maintain apposition while the upper anastomosis is being done.

The aortic anastomosis is performed in the same way as the iliac anastomosis; the posterior layer is dealt with first and two separate continuous silk sutures are used for each layer. It is doubtful whether a reinforcing 'cuff' is of any value and it has the disadvantage that it may merely 'camouflage' leakage at the anastomosis and so lead to a false sense of security.

Re-establishment of the Circulation in the Legs

The blood-pressure cuffs around the thighs are inflated to 220 mm. Hg. With the iliac vessels still occluded with Blalock clamps the aortic clamp is momentarily released to fill the graft with blood while air escapes through the walls of the graft. The iliac clamps are then removed and the aortic clamp is released. There may be considerable 'sweating' of blood through the walls of the graft at this stage, but this soon ceases and is easily controlled by dry packs. Leaks at the anastomotic sites may occur and should be controlled by a few re-inforcing interrupted mattress sutures. Leaks from untied lumbar vessels may prove troublesome and must also be sutured. Severe bleeding should not occur but, if it does, the aortic clamp must be closed while reinforcing sutures are being inserted. When a 'dry' anastomosis has been obtained, the aortic clamp is removed (Fig. 12).

Release of the aortic clamp is likely to be followed by the most critical period during the operation and the cuffs on the thighs are a necessary precaution to minimize the haemodynamic upset which occurs. It is therefore important that the surgeon should warn the anaesthetist of the impending release of the clamp to allow time for inflation of the cuffs and commencement of rapid blood transfusion.

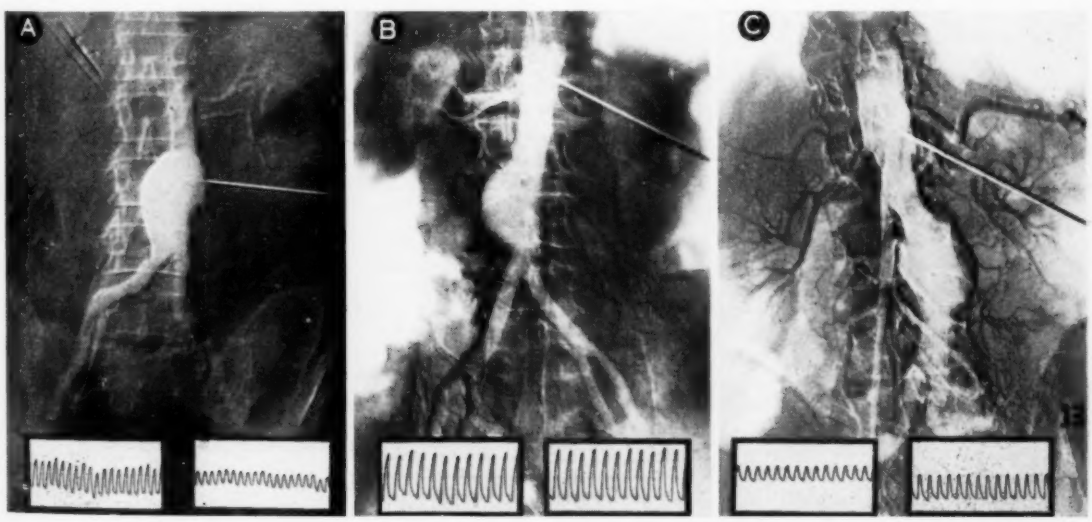


Fig. 13. Three cases of abdominal aneurysms which have since been resected and replaced by Y-shaped Ivalon-Nylon net grafts. Inset: oscillograms following operation.

When the clamp is released there is usually a profound fall in blood pressure, which may become unrecordable. This is counteracted by rapid transfusion and the Trendelenburg position. The cuffs are deflated one at a time when circulatory compensation has occurred. Once again a fall in blood pressure may be expected owing to the lowered peripheral resistance in the legs caused by the reactionary hyperaemia following prolonged ischaemia. If this secondary fall is severe, the cuffs must be re-inflated, and occasionally the process of release and inflation of the cuffs may have to be repeated several times before an adequate blood pressure is maintained.

In the one patient who exhibited a fall in blood pressure after clamping of the aorta, no fall in pressure occurred when the clamp was released. There was, in fact, a progressive rise in pressure in spite of full circulation in the legs as evidenced by easily palpable pulses. It is felt that the paradoxical state of affairs encountered in this case might have been due to factors concerned with venous return.

Vasopressors are best avoided because of the risk of prolonged ischaemia from spasm of collateral vessels. However, should circulatory compensation fail to occur in the face of full blood-volume replacement, a noradrenaline infusion must be used. In our patient who succumbed, this was the only effective means of maintaining the blood pressure.

When the blood pressure has been stabilized, the iliac vessels distal to the anastomoses are tested for pulsation, and it is comforting to hear from our onlooker that the peripheral pulses are palpable.

Completion of the Operation

A final search is made for bleeding points, particular attention being paid to small lumbar venous tributaries and fine twigs entering the vena cava. These are satisfactorily controlled with diathermy coagulation.

Once a perfectly dry bed has been achieved, the posterior parietal peritoneum should be reconstituted as far as possible. It is important to cover the graft completely because the intestines tend to adhere to the foreign material. (Two of our patients developed post-operative intestinal obstruction on account of this.) It is usually not possible or feasible to close the peritoneum completely. A gap may be left over the sacral promontory below the graft and this will allow for the subsequent escape of blood from oozing.

A corrugated drain is inserted into the pelvis, the pelvic colon is once more examined to assess its viability, the intestines are replaced in the peritoneal cavity, and the abdominal wound is then closed in layers.

RESULTS OF RESECTION AND GRAFTING

The results of surgery must be viewed in the light of the serious prognosis of untreated aneurysms. We fully agree with Wright[38] that 'if surgery is to be elected, it must be justified by evidence that the risk is less serious than the prognosis without surgery'.

De Bakey and his group[19] have probably had the greatest experience with resection of aneurysms, and their operative mortality has been 22% (20 out of 89 patients). Our series is too small to be judged but we are satisfied that the average competent general surgeon who has had some practice in animal experiments can achieve similar results.

It is, as yet, too early to assess the long-term results. It must be remembered that the majority of patients are well over 60 years old, often with generalized vascular disease and a poor life expectancy in any case. On the other hand, the normal life expectancy at 65 years is 8 years[5] and to deny a patient the chance of increased life simply on chronological age is hardly justifiable. One of our patients operated upon 9 months ago is still very well and back at his normal work, and other authors have reported much longer survival periods. We have studied the fate of the graft in animals[20] and from these observations it would appear that aneurysmal dilatation or occlusion at the site of the graft need not be seriously feared.

Where resection has been performed because of rupture of the aneurysm, the value of surgery cannot be questioned and the same probably applies to leakage. One of our patients would surely have died within a matter of hours if the operation had not been done. He has been successfully treated and is very well 2 months later.

The risks and complications of infrarenal resections are infinitely less than those which include the major branches of the aorta, and fortunately the majority of abdominal aneurysms are situated below the renal arteries. In these, the operation can be completed well within the time required to avoid irreversible ischaemic changes. Complications due to ischaemia of the spinal cord are rare, but one of our cases has evidence of bladder involvement. The main risks of infrarenal resections are thrombosis of the peripheral vessels with gangrene of one or both limbs, necrosis of the colon and leakage at the suture lines. In all our cases the distal anastomosis was made at the common or external iliac arteries and in all of them the femoral pulses were patent after the operation. In those that have survived, the peripheral circulation has not only remained patent, but has also shown signs of improvement. The inferior mesenteric artery was sacrificed in all our cases and one of them developed necrosis of the pelvic colon. We are, therefore, well satisfied that the operation has been worth while in all our cases.

SUMMARY

This report is based on an analysis of 28 abdominal aneurysms seen since 1953; 13, of which 7 have been operated upon, were seen during the past year.

The incidence, pathology and clinical features of abdominal aortic aneurysms are discussed. An explanation is given for the tendency of aneurysms to occur just distal to the renal arteries, the effects of the aneurysm on neighbouring structures are illustrated, and the diagnostic difficulties that arise after rupture are emphasized.

The value, indications and complications of aortography are discussed and our technique is described.

It is pointed out that the prognosis is serious in all cases and particularly in those who present with leakage. On the other hand, frank rupture is not necessarily immediately fatal and there is usually still sufficient time for operative intervention.

The indications for surgical treatment are discussed and the technique of resection and grafting of infrarenal aneurysms is described in detail. The results of surgical treatment are briefly reviewed.

We wish to thank our colleagues who referred the cases to us and particularly Prof. F. D. du Toit van Zyl and Mr. B. Dreyer, of the Stellenbosch Medical School, who operated on 3 of the patients included in the series.

We are indebted to Dr. N. H. G. Cloete, Superintendent of Groote Schuur Hospital, for permission to publish the data concerning the cases, to Miss T. Morison, Mrs. C. C. Goosen and Mr. B. Todt, of the Department of Clinical Photography, for the excellent photographs, and to members of staff for their assistance.

The expenses of this and collateral investigations have been

met from grants provided by the University of Cape Town Staff Research Fund, Fourcade Bequest, and C. L. Herman Research Fund.

REFERENCES

1. Bryant, J. H. (1903): Clin. J. (Lond.), **23**, 71.
2. Osler, W. (1905): Lancet, **2**, 1089.
3. Lucke, B. and Rea, M. H. (1921): J. Amer. Med. Assoc., **77**, 935.
4. Maniglia, R. and Gregory, J. E. (1952): Arch. Path., **54**, 298.
5. Blakemore, A. H. (1946): Surg. Clin. N. Amer., **26**, 349.
6. Ruffin, M. de G., Castleman, B. and White, P.D. (1941): Amer. Heart. J., **22**, 458.
7. Blakemore, A. H. and Voorhees, A. R. (1954): Angiology, **5**, 209.
8. Estes, J. E. (1950): Circulation, **2**, 258.
9. Goetz, R. H., Nellen, M., Schrire, V. and Vogelpoel, L. (1955): Angiology, **6**, 63.
10. Linton, R. R. (1951): *Ibid.*, **2**, 485.
11. Karabin, J. E. (1942): Amer. J. Surg., **56**, 471.
12. Nixon, J. A. (1912): St. Bart's Hosp. Rep., **47**, 43.
13. Kampmeier, R. H. (1936): Amer. J. Med. Sci., **192**, 97.
14. Broca, P. (1856): *Des Anévrysmes et de leur Traitement*. Ed. Labe, Libraire de la Faculte de Médecine, Paris.
15. Monahan, D. T. (1944): Surgery, **16**, 519.
16. Blakemore, A. H. (1951): Ann. Surg., **133**, 447.
17. de Takats, G. and Reynolds, J. T. (1947): Surgery, **21**, 443.
18. Barnes, T. G. and Yeager, G. H. (1953): *Ibid.*, **33**, 658.
19. Page, I. H. (1939): J. Amer. Med. Assoc., **113**, 2046.
20. Abbott, O. A. (1949): J. Thorac. Surg., **18**, 435.
21. Cooley, D. A. and de Bakey, M. E. (1953): Surgery, **34**, 1005.
22. Wylie, E. J., Kerr, E. and Davies, O. (1951): Surg. Gynec. Obstet., **93**, 257.
23. Bahnson, H. T. (1953): *Ibid.*, **96**, 383.
24. de Bakey, M. E. and Cooley, D. A. (1953): *Ibid.*, **97**, 257.
25. Swan, H. (1952): *Ibid.*, **94**, 115.
26. Bahnson, H. T. (1954): Circulation, **9**, 494.
27. Gross, R. E., Bell, A. H. and Pierce, E. C. (1949): Surg. Gynec. Obstet., **88**, 689.
28. Dubost, C., Allary, M. and Oeconomos, N. (1952): Arch. Surg., **64**, 405.
29. Voorhees, A. B., Jaretski, S. and Blakemore, A. H. (1952): Ann. Surg., **135**, 332.
30. Goetz, R. H. (1957): S. Afr. Med. J., **31**, 582.
31. Copping, G. A. (1953): J. Amer. Med. Assoc., **151**, 374.
32. Goldowsky, S. J. (1952): Rhode I. Med. J., **35**, 604.
33. Blakemore, A. H. and King, B. G. (1938): J. Amer. Med. Assoc., **111**, 1821.
34. Adams, H. D. and van Geertruyden, H. H. (1956): Ann. Surg., **144**, 593.
35. Rob, C. G., Eastcott, J. J. G. and Owen, K. (1956): Brit. J. Surg., **43**, 449.
36. Dubost, C., Allary, M. and Oeconomos, N. (1951): Arch. Mal. Cœur, **44**, 848.
37. Ellis, F. H. and Kirklin, J. W. (1956): Postgrad. Med., **20**, 494.
38. Wright, I. S., Urdaneta, E. and Wright, B. (1956): Circulation, **13**, 754.
39. Goetz, R. H. (1946): Amer. Heart J., **31**, 146.
40. Thornton, H. L. (1957): Brit. Med. J., **32**, 253.

CAPILLARIA HEPATICA INFECTION IN MAN

A SYNDROME OF EXTREME EOSINOPHILIA, HEPATOMEGALY AND HYPERGLOBULINAEMIA

J. CRAIG COCHRANE, B.Sc., M.D. (RAND), M.D. (LOND.), M.R.C.P.

Vanderbijlpark and Medical Professorial Unit, University of the Witwatersrand

L. SAGORIN, B.Sc. (RAND.), D.C.H. (ENG.), M.R.C.P. (EDIN.)

Durban

M. G. WILCOCKS, M.B., B.CH. (RAND.)

South African Institute of Medical Research, Johannesburg

Infestation with *Capillaria hepatica* is common in rodents and small domestic animals. Four cases only have so far been described in humans. The case now described is the first to be recorded in South Africa and the third to be diagnosed in life.

The first case of human infection was reported by MacArthur.[1, 5] Autopsy of the liver of a British soldier in India—thought to have died of pyaemia—showed foci containing enormous numbers of Capillaria ova.

McQuown[2] reported the finding of eggs of the parasite in the liver of a Negro infant in New Orleans who died of pneumonia, hepatomegaly and haemorrhagic ascites.

Otto *et al.*[3] diagnosed their case by liver biopsy in which both ova and worms were present. The clinical picture was of a severe illness with pyrexia, hepatosplenomegaly, eosinophilia of 85%, and globulin of 9 g.%. The child improved, to remain in good condition for 2 years before dying of cirrhosis.

Ewing and Tilden[4] reported the fourth case, again in an infant, from Hawaii. Enlargement of the liver and spleen

Fig. 1. Infected rat liver. The greyish-white granulomata, up to several mm. in diameter, can be seen on the surface.

and an eosinophilia of 56% were present. Liver biopsy was first reported as a Trichuris infestation, later to be corrected to Capillaria. The patient died within 4 weeks with gross distorting fibrosis of the liver.

CASE REPORT

F.C., a European child of Afrikaner parents, was 15 months old when her present illness began. Like previous victims she was a prodigious earth-eater.

Past Illnesses: Mild enteritis with negative stools; whooping cough.

Family History: The father and one brother had unexplained eosinophile counts of 8% and 10%.

The family, at the time of F.C.'s illness in June-July 1956, lived on the small-holdings on the outskirts of Vanderbijlpark, Transvaal. Domestic animals, rats and mice, and indigenous rodents such as the meerkat, moved freely in this area. All these creatures harbour and pass on *Capillaria hepatica*. Dramatically enough the one rat (*Mastomys batalensis*) we were able to trap in the patient's home—although this was some months later, in November 1956—showed extensive infestation with *Capillaria* (Figs. 1 and 2).

Present Illness

In June 1956 the child was noted to be feverish and very peevish. There were no specific system complaints.

4 July 1956—Vanderbijlpark Hospital (J.C.C.)—On examination she was found to be pale and seriously ill. A large umbilical hernia was present but, apart from this, the only signs of note were small mobile enlarged glands in the cervical groups and a non-tender enlargement of the liver to 4 finger-breadths below the costal margin.

The temperature swung between 99° and 105°F throughout the first 7 weeks of observation.

A blood count on 20 July 1956, showed an absolute eosinophilia of 14,000 per c.mm.

The differential diagnosis of so high an eosinophilia in a young child was considered and a programme of investigations planned:

1. *Eosinophilic leukaemia:* Two bone-marrow biopsies were reported as supporting a diagnosis of reactive eosinophilia only.
2. *Eosinophilic granuloma:* No tumours were seen on X-ray of the skeleton.
3. *Loeffler's syndrome:* Four chest X-rays were negative.
4. *Intestinal parasites:* Approximately 30 stool examinations were all negative. No parasites were recovered during two courses of Entacyl. A barium meal was negative.
5. *Bilharziasis:* Stools and urine were negative for ova. Complement-fixation test was negative.
6. *Amoebiasis:* Stools and complement-fixation test negative.
7. *Tropical Eosinophilia:* There was no sign of bronchial asthma as described in this syndrome.
8. *Periarteritis nodosa:* Biopsy of a gland and section from the axilla showed blood vessels packed with eosinophils but was otherwise non-specific.
9. *Typhoid, paratyphoid, and pyrexia of unknown origin:* All agglutination tests, the Wassermann test, and the histoplasm and coccidiodin tests were negative.
10. *Parasitic infestation of the liver:* The thymol turbidity and flocculation tests, colloidal-red test, cephalin flocculation test, Takata-Ara test, and diethyl-barbituric acid test, were all maximally positive. Gamma-globulin was 5 g.%.

Blood counts: A secondary anaemia with 8·6 g.% of haemoglobin was present. The leucocyte count was usually in the region of 25,000 per c.mm., with polymorphonuclears 12-33% and lymphocytes 27-43%. The eosinophile count over 5 months ranged from 25% to 78% and the absolute total from 6,630 to 32,526 per c.mm.

The child was so ill that biopsy was postponed until the condition warranted laparotomy, inspection of the liver and repair of the umbilical hernia.

Appearance of the Liver at Operation: 'Moderately enlarged, the surface studded with yellow-grey nodules of pinhead size. In areas these have aggregated to form an irregular lesion of 2-3 cm. diameter. Surface otherwise normal. No free fluid nor venous engorgement to suggest early cirrhosis. Spleen not enlarged.'

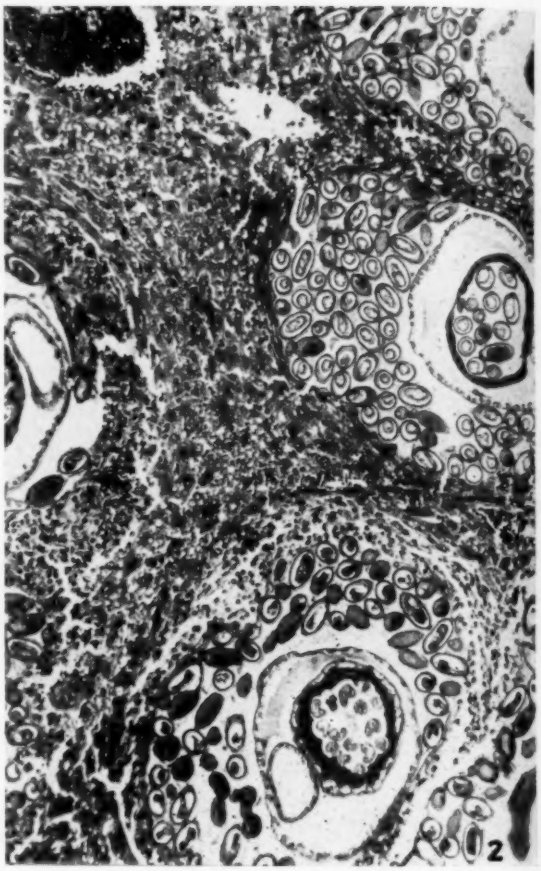


Fig. 2. Section of rat liver. The absence of the intense surrounding inflammatory reaction seen in the human liver (Figs. 3 and 4) is apparent. Worms are present and are seen in section.

Description of Section

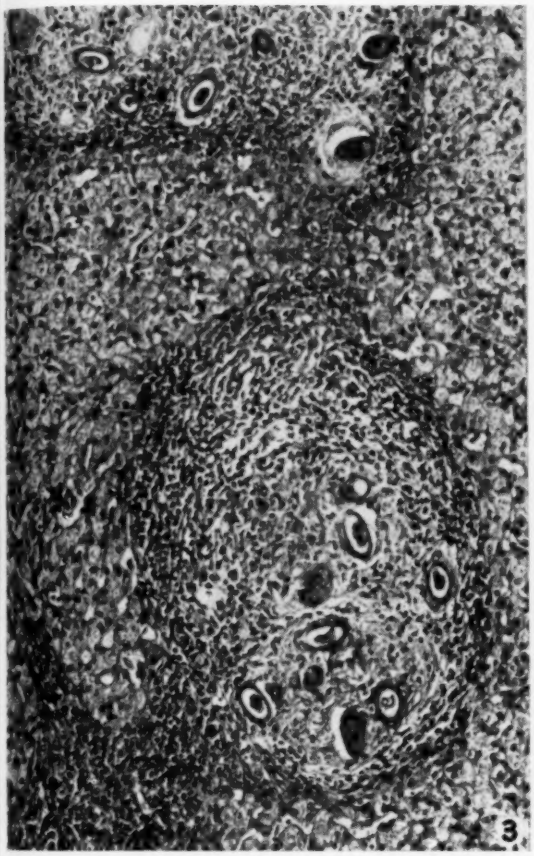
Section of the liver biopsy showed deposition in the portal tracts of large numbers of ova (approximately 60 × 30 microns). Most of them were oval in shape and in some an operculum could be seen at one or both ends. The ovum had a double shell with striations between the inner and outer walls. The inner wall was lined by a thin membranous layer within which lay the contracted ? albuminous content of the ovum. Many of the ova were circular in appearance—presumably cross-sections at different levels. Surrounding the ova was a dense cellular infiltrate consisting of a large number of eosinophils, plasma cells, lymphocytes and histiocytes. Some of the ova were degenerate in appearance and were associated with foreign-body giant cells. In some areas of the section the cellular infiltrate had been replaced by fibrosis with a narrow rim of surrounding inflammatory cells.

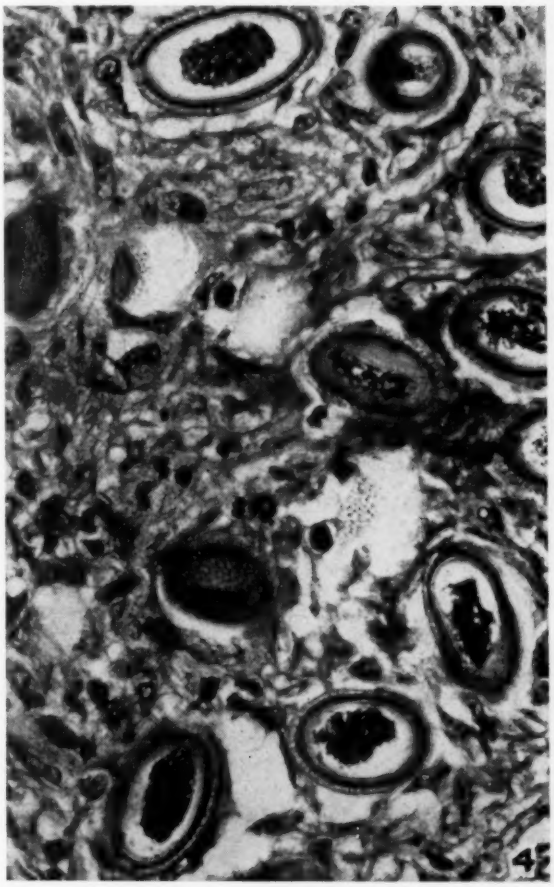
The inflammatory and fibrous-tissue proliferation around the ova had produced a marked distortion of the liver pattern. No evidence of liver-cell regeneration was observed.

There appeared to be some destruction of liver cells around the inflammatory and fibrous-tissue foci related to the ova, but the liver cells elsewhere appeared to be normal.

The histological features suggested that the ova were those of a species of Trichuris.

A specific diagnosis of *Capillaria hepatica* was made by one





Figs. 3 *and* 4. Patient F.G. Periportal lesions contain numerous ova of *Capillaria hepatica*. A severe chronic inflammatory lesion with fibrosis encloses the granuloma. The bipolar opercula where the prominence does not protrude beyond the shell (in contrast to *Trichuris trichiura* where they do) is well seen. No worms are present. The liver cells appear normal.

of us (L.S.) in a follow-up of the current literature. The pathological description of previous cases differs in no essential from that of the present case.

Progress and Treatment

The patient was extremely ill, with a swinging pyrexia, for 3½ months. At the present time she is very well. The factors in the clinical improvement cannot be fixed, but the following treatments were used:

Terramycin, achromycin and penicillin were given in separate courses. They failed to control the pyrexia.

Chloromycetin appeared to control the temperature on 2 occasions, after 4 days.

Meticorten, 5 mg. daily (given with a view to reducing the fibrosis and with Methischol as a liver supportive measure) appeared to bring about a considerable improvement in the general condition. Over 2 months improvement continued and the rises of temperature became less frequent.

It was then decided to attempt 'specific' therapy against the ova. As chloraquin, emetine and hetrazan had been tried in previous cases without effect, it was decided to give antimony. Triostam, by intravenous injection, was given to a total of 380 mg. in 7 injections. Since this course no further rise in temperature has occurred and the liver has decreased in size to one finger breadth below the costal margin. Eosinophilia, however, remains in the region of 30%.

At the time of publication the child remains well. She will be kept under observation, the liver-function and blood tests will be regularly repeated, and a second liver biopsy will be performed.

ZOOLOGY OF CAPILLARIA HEPATICA

The parasite is a nematode and was discovered by Bancroft in 1893. Subgroup: *Aphasmidia*. Order: *Trichinelloidea*. Subfamily: *Trichurinae*. Genus: *Capillaria*. The worm is very similar to Trichuris (whipworm), with which it has been confused, and taxonomically they belong to the same family. Like Trichuris, *Capillaria hepatica* has a thick posterior part of the body, which contains the organs of reproduction, and a long anterior whip-like part occupied only by the slender oesophagus. Although alike in form, Capillaria has the more delicate body and the shorter oesophageal portion.[6] More accurate diagnostic differentiation from the whipworm is made by a study of the ova and the life cycle.[7-11]

COMPARISON OF CAPILLARIA HEPATICA AND TRICHURIS TRICHIURA

Capillaria hepatica	*Trichuris trichiura*
Size 54-64 μ by 29-33 μ.	Size 49-54 μ by 21-23 μ.
Double shell. Outer shell distinctly pitted and there is a radiating effect between the shells.	Double shell, with a smooth outer shell.
Elliptical shape, with smooth ends.	Barrel-shaped, and the ends protrude forward.
Bipolar intralaminar prominences (small mucous plugs) which do not protrude beyond the outer shell.	Bipolar intralaminar prominences, extending beyond the outer shell.
Ova passed through the intestine in the morula or immature 2-cell stage.	Ova are passed through in the unsegmented stage.
Ova may pass through the intestine tract with contaminated ingested food.	Ova embryonate in the soil.
Adult worms pass to the liver, where the ova accumulate.	Adult worms live in the intestine.
General visceral dissemination may occur.	The parasite remains in the lower ileum and large bowel.
Seldom found in humans.	As frequent in humans as in pigs.
Ova freed from liver by cannibalism of rats.	Ova passes in faeces.

Animal Distribution

The parasite occurs in many animals, including rats, mice, squirrels, rabbits, hares, dogs, cats, prairie dogs, beavers, muskrats, peccaries, monkeys and pigs.[6, 4, 7, 3]

South African Distribution

In South Africa *Capillaria hepatica* has been reported in mice, rats, rabbits, hares, meerkats, and the gerbille. We have recently examined a random group of 40 rats received by the South African Institute for Medical Research, Johannesburg. Of the 40, 19 were found to be infested with Capillaria.

Life Cycle

For our knowledge of the life cycle of this parasite we are chiefly indebted to Luttermoser,[8] who worked on rats. When embryonated eggs are ingested they pass to the caecum and thence through the portal circulation to the liver, where the worms mature. In the liver eggs are laid and the adult worm disintegrates. The ova escape from the liver only upon death of the host, and under natural conditions are released through cannibalism of rats. When egg-containing liver is eaten by a second rat, the eggs are passed by it in the faeces. There is a difference of opinion whether the ova can embryonate in the liver and directly infect the animal ingesting the liver (Faust[9]), or whether they first require exposure to air and the soil (Chandler[6]). By one or both these processes, however, the eggs are picked up by a suitable host and their life cycle begins again.

It is of interest here to quote the spurious cases of infestation reported by McQuown.[7] 'Ova were found in the stools of a white student-nurse after she had eaten fried squirrel whose liver had been used in preparing the gravy. Three years later on a routine survey in the same North American town, ova were found on 2 successive days again in the stools of a white student nurse, who had eaten wild duck for dinner, the dressing having been prepared from squirrel liver. In both cases, the heat-killed ova simply passed unaltered through the intestinal tract and neither the worms nor the eggs entered the tissues of the patient. The liver was not involved.'

HUMAN CYCLE

Source of Infection

Infection with *Capillaria hepatica* in our case was almost certainly due to ingestion of embryonated ova in soil of high moisture content—like previous cases, our child was a prodigious earth-eater. The ova may have been deposited by domestic animals, rats (one trapped in the patient's home was found to be heavily infested by the parasite), mice, rabbits, hares or meerkats.

Diagnosis

Eosinophilia to a very marked degree (it reached 78% in our patient) is the most important sign in Capillaria infection. Chronic eosinophilia of ill-defined origin has been described under such terms as Loeffler's syndrome, Weingarten's disease, Frimodt-Moller's syndrome, familial eosinophilia, eosinophilic pseudo-leukaemia, and the allergic hyperergic tissue response of Zuelzer and Apt.[16] Recent reports, however, suggest that all these may well be different descriptions of one entity, the result of parasitic infestation of the liver. Our present description of *Capillaria hepatica* invasion would therefore fall within this group. The broad syndrome[17, 18 20] common to them all is enlargement of the liver, marked chronic eosinophilia, eosinophilic granulomatous lesions of the liver, pyrexia, leucocytosis, and hypergammaglobulinaemia. Pulmonary X-ray changes may or may not be present.

The syndrome has been reported mainly in association with infection with larval forms of Ascaris,[12-15, 19] and of *Toxocara canis* and *mystax*, which are common ascarids of the dog and cat.

In our case we made a provisional diagnosis of infection with the larval form of *Toxocara canis*. In these cases the disease is relatively benign and the prognosis is in contrast to that of *Capillaria hepatica*, where the intense fibrosis of the liver and intractible cirrhosis make the outlook serious in the extreme.

The diagnosis of *Capillaria hepatica* infestation can be accurately established only by liver biopsy, with the histological finding of typical ova and (possibly) remnants of adult worms. Seeking the ova in the stools is of little value, for they are unable to escape from the liver. Should ova be found in the stools, it is no evidence of active infection; it merely suggests that the patient has eaten infected material.

Prognosis

Death has occurred in all cases of infestation with *Capillaria hepatica* so far reported. Initially the patient may thrive, put on weight and be apparently well, but the maximal survival has so far been only 2 years. Cirrhosis is relentlessly progressive and death occurs from liver failure.

Treatment

No treatment has yet been found to be effective. The intense fibrosis around the ova in the liver appears to provide an impenetrable barrier to therapeutic agents. The present good health of our child, however, permits some hope that the combination of antibiotics, cortisone, liver supportive measures, and antimony may be successful.

Prophylaxis

Earth-eating appears to be an essential to the acquisition of *Capillaria hepatica* infestation. As a high percentage of the rat and other rodent population in this country is probably infected with the parasite it is surprising that the incidence in children is not greater. It may well exist in a non-fatal or sub-clinical form and be the cause of much unexplained eosinophilia and chronic hepatic ill-health. This possibility provides an urgent argument for public-health measures for the eradication of undesirable rodents, and for strict discouragement of earth-eating in infancy and early childhood.

SUMMARY

A case of infestation with *Capillaria hepatica* in a child, an earth-eater, aged 15 months, is described.

This is the fifth case to be reported in world literature, the third to be diagnosed in life and the first to be recorded in South Africa. All other cases have ended fatally.

The appearances of the parasite, and the liver biopsy, are described.

The present good condition of the child, the effect of treatment and the possibilities of specific treatment, are considered.

The possibility of mild cases of the condition escaping recognition is suggested.

REFERENCES

1. MacArthur, W. P. (1924): Proc. Roy. Soc. Med., **17,** 83.
2. McQuown, A. L. (1950): Amer. J. Trop. Med., **30,** 761.
3. Otto, G. F., Berthrong, M., Appleby, R. E., Rawlins, J. C. and Wilbur, O. (1954): Bull. Johns Hopk. Hosp., **94,** 319.
4. Ewing, G. M. and Tilden, I. L. (1956): J. Pediat., **48,** 341.
5. Dive, G. H., Lasrenais, H., MacArthur, W. P. (1924): J. Roy. Army Med. Cps., **43,** 1.
6. Chandler, A. C. (1955): *Introduction to Parasitology*, p. 395. New York: John Wiley.
7. McQuown, A. L. (1954): Amer. J. Clin. Path., **24,** 448.
8. Luttermoser, G. W. (1938): Amer. J. Hyg., **27,** 321.
9. Faust, E. C. (1949): *Human Helminthology*, 3rd ed. New York: Lea and Febiger.
10. Foster, A. D. and Johnson, C. M. (1939): Proc. Roy. Soc. Trop. Med. Hyg., **32,** 639.
11. Manson-Bahr, P. H. (1945): *Manson's Tropical Diseases*. London: Cassel.
12. Perlingiero, J. G. and Gyorgy, P. (1947): Amer. J. Dis. Child, **73,** 34.
13. Mercer, R. D., Lund, H. Z., Bloomfield, R. A. and Caldwell, F. E. (1950): *Ibid.*, **80,** 46.
14. Behrer, M. R. (1951): J. Pediat., **38,** 635.
15. Beaver, P. C., Snyder, C. H., Carrera, G. M., Dent, J. H. and Lafferty, J. W. (1952): Pediatrics, **9,** 7.
16. Zuelzer, W. and Apt, L. (1949): Amer. J. Dis. Child., **78,** 153.
17. Silver, K. H., Henderson, P. and Contopoulos, A. (1952): *Ibid.*, **83,** 649.
18. Thomson, A. P., Wilson, G. H. and McDonald, S. (1937): Lancet, **2,** 9.
19. Vogel, H. and Minning, W. Cited by Mercer *et al.*, *loc. cit.*[12]
20. Atmar, R. C. (1940): J. Amer. Med. Assoc., **115,** 449.

INCOME TAX AS IT AFFECTS THE MEDICAL PRACTITIONER

DAVID SHRAND, M.COM., A.S.A.A., C.A. (S.A.)

Author of: 'What Every Taxpayer Should Know About Income Tax', 'What Every Farmer Should Know About Income Tax,' 'Studies in Income Tax', etc.

It is proposed to deal in this article with the various income tax repercussions that may arise in the conduct of a medical practice as well as the income tax implications of various transactions medical practitioners commonly engage in. This approach resolves itself into a review of two aspects, viz (*a*) The nature and type of income that carries income tax liability, and (*b*) the nature and type of expenditure that is allowable against the income.

As a prelude to the examination of these two categories, the formula that applies in the determination of taxable income is set out as follows:

Total Receipts less receipts or accruals of a capital nature and income from a non-Union source	= Gross Income
Gross Income less Exempt Income ..	= Income
Income less allowable deductions ..	= Taxable Income

Taxable income is the amount on which normal tax is calculated according to rates fixed annually by Parliament. In addition, certain income which is not subject to normal tax, e.g. dividends from public or private companies, is added to the taxable income to form income subject to super tax on which super tax is calculated, again according to rates fixed annually by Parliament. Super tax is only payable by a person whose income subject to super tax is in excess of £2,300.

According to the above-mentioned formula, the Income Tax Act begins with 'gross income' as the starting-point in the computation of taxable income. Briefly, 'gross income' is defined in terms of section 7 as the total amount, whether in cash or otherwise, received by or accrued to or in favour of any person, excluding receipts or accruals of a capital nature and receipts from a non-Union source. From the 'gross income' certain income which is specifically exempt from tax is deducted. The amount remaining is known as 'income'. From 'income' the expenses incurred in the production of the income are allowed as deductions and the balance is known as 'taxable income', on which the tax is calculated. If the allowable expenses exceed the income, the result is known as an assessed loss, which can be carried forward to the succeeding year to be set off against subsequent income, provided there is no break in the continuity of trading operations in respect of a particular year of assessment.

A. THE NATURE AND TYPE OF INCOME THAT ATTRACTS TAX LIABILITY

Although the Income Tax Act provides for the taxation of incomes, only income within the meaning of the Act falls within its purview. The Act makes no reference to profits as the basis of assessment but confines itself to income. In order to attract income tax liability, income must conform to the definition and meaning of income as contemplated in the Act.

Capital receipts and accruals fall outside the ambit of the Act. The Income Tax Act does not define the term 'capital receipts and accruals' but the courts have frequently been called upon to define the characteristics of capital receipts. The main dividing line between capital and income is that income connotes something which is in the nature of interest or fruit, as opposed to principal or tree; income is what capital produces. Thus, if a person buys property for letting purposes, the rentals received constitute income arising from capital productively employed, and are subject to tax. If the property is subsequently sold at a profit, such profit will represent a capital receipt arising from the realization of an investment at an enhanced price. Similarly, if a medical practitioner sells his practice, any goodwill received represents a capital accrual and is not chargeable with tax.

Date of Accrual

The Commissioner may exercise his discretion to claim any amount received during the tax year as gross income of the recipient or any amount accrued during the tax year. If the Commissioner taxes an amount in the year of accrual such amount will not be subject to tax again in the year of receipt.

In order to ascertain whether income falls within a particular year of assessment, it is necessary to know the date of accrual, that is, the date when the recipient became entitled to the income. The general test to apply to determine the date of accrual is the ascertainment of the date when the recipient became entitled to the income, i.e. the date he acquired an enforceable right to the income. Thus, the date of accrual of dividends is the date of declaration as it is only from that date that shareholders are entitled to claim payment.

Where a taxpayer renders his return on a cash basis (e.g. professional persons) the date of receipt of income arising from professional services rendered is treated as the date of accrual.

'Cash' or 'Accrued' Basis of Determination of Income in Respect of Professional Persons

The practice in the past was to allow professional persons to render their returns either on a 'cash'or on an 'accrued' basis. The Commissioner, while permitting those who rendered their returns in the past on the 'cash' basis to continue this practice, has issued instructions that in future all persons who commence professional practice must render their first and subsequent returns on the 'accrued' basis. A change-over from the 'accrued' basis to the 'cash' basis is not permitted, although those on the 'cash' basis may change to the 'accrued' basis.

In the case of the 'cash' basis, cash actually received during the tax year from clients as fees is treated as income, irrespective of the period in which they were earned. The 'cash' basis is only applicable to income arising from professional services rendered and not to income from other sources.

Where the 'accrued' basis is adopted, the actual fees earned during the tax year, whether paid or still outstanding at the end of the tax year, are treated as income.

The 'cash' basis only applies to the income arising from professional services rendered and not to the expenditure incurred. Whether a taxpayer renders his return on the 'cash' basis or the 'accrued' basis, the allowable expenses claimed must have been incurred during the tax year under review, irrespective of the date of payment.

The distinction between the 'cash' and 'accrued' basis is illustrated as follows:

If a medical practitioner, during the tax year, earned fees amounting to say £4,000 but only received from his patients £2,500 in cash during the tax year in question, the amount of £2,500 will be included in his gross income for tax purposes, where the 'cash' basis has been adopted. If the 'accrued' basis is adopted, the amount of £4,000 will be included in his gross income for tax purposes.

Types of Income that are Taxable

If a medical practitioner engages in work not associated with his profession, e.g. free-lance journalism, he is taxable on the income derived from that source even if it is an isolated transaction. Thus executors' fees and fees paid to members of government commissions, rent boards, control boards under the Marketing Act, etc., are taxable even if they are of a casual nature. Where a medical practitioner receives payment of fees in kind, the value thereof is taxable in his hands. If a person receives shares in a company as payment for professional services rendered, he is chargeable with tax on the market value of the shares as at the date of accrual. Where a medical practitioner holds a full-time appointment and he is provided with a free house or quarters, the rental value thereof is taxable. If a person receives any perquisites or benefits arising from some office he may hold, the value thereof forms part of his taxable income. Where a person owns a seaside cottage and rents it for part of the tax year, the rents received less a proportionate part of the expenses incurred are taxable.

If a person buys a vacant plot with a view to re-sale, any profit on realization is taxable on the ground that it represents the culmination of a profit-making scheme. On the other hand, if a person buys a property for investment purposes or for his own use and later realizes it, any profit made is a capital accrual and not taxable on the ground that the transaction constitutes the mere realization of an investment at an enhanced value.

In terms of section 7(*a*) any amount received or accrued by way of annuity forms part of a taxpayer's gross income. The fact that an annuity is paid from capital is immaterial. If an annuity is paid out of income which is exempt from tax, this does not exempt the annuity from taxation in the hands of the recipient. Ordinarily gifts are not subject to tax but if they take the form of an annuity they are taxable.

Section 7(*d*) provides that gross income shall include any premiums or like consideration received or accrued for the right of use or occupation of land or buildings, plant and machinery and of any patent, design, copywright or trade marks. The word 'premium' for the purpose of this subparagraph has been construed to mean a payment or consideration paid by a lessee to a lessor for entering into a lease of property and which premium is over and above the rent payable.

If patent rights are sold out-and-out for a lump-sum by a person who does not deal in patents, the proceeds constitute a capital accrual and are not taxable. If an inventor grants a licence for the use of his patent, the royalties received are taxable. If an author receives a lump-sum of royalties for the copyright of a book, such lump-sum is taxable.

If an asset is sold for an amount greater than the book value (i.e. cost less depreciation allowed) such excess will be added back to income as recoupment of depreciation up to the extent of depreciation previously allowed. For example, if a motor-car used for business purposes stands in the books of a taxpayer on the date of sale at £500 and is sold for £750, the balance of £250 would be added back to income as recoupment of wear-and-tear allowance (i.e. depreciation) up to the extent of wear and tear previously allowed, the reason for this being that an amount previously deducted from income had subsequently been recovered by the taxpayer. If the wear and tear allowed in the previous year amounted to, say, £150, only this amount will be added back for income tax purposes.

If on the other hand, the wear-and-tear allowance in the previous year amounted to £350, the full amount of £250 previously deducted from income will be added back to the taxpayer's income.

Exempt Income

In terms of section 10 of the Income Tax Act. certain categories of income are specifically exempt from tax. The exemptions that may be of interest to medical practitioners are listed as follows:

Any amount received as a war pension or as an award or a benefit under any law relating to miners' phthisis.

Interest received from any deposit in the Post Office Savings Bank of the Union, including interest on Post Office Savings Bank Certificates or on Tax Redemption Certificates, or annual interest accrued in respect of any Union Loan Certificates and any amount credited as interest in respect of any contributory share, but not in respect of any amount paid or credited on any paid-up share in any building society: Provided that the exemption in respect of interest on deposits in the Post Office Savings Bank, or Post Offices Saving Bank Certificates and on Tax Redemption Certificates made or held by any one person shall be limited in each case to the sum of £25.

So much of any gratuity received by or accrued to any person from his employer as the Commissioner deems to be a grant made because such person had obtained a University degree or diploma or had been successful in some examination, and not remuneration, or any portion of remuneration, for services rendered or to be rendered.

Any amount received by or accrued to an author of a work in respect of the assignment of or grant of an interest in a copyright in such work if such amount is chargeable with income tax in a country other than the Union: Provided that this exemption shall not apply to any person who is not the first owner of a copyright in terms of Chapter IV of the Patents, Designs, Trade Marks and Copyright Act, 1916, or to a company.

Fees Earned from a non-Union Source

Only income derived from a source within the Union or deemed to be within the Union is taxable. In terms of the 1955 Income Tax Act all dividends are chargeable with tax, irrespective of their source. No super tax is payable on dividends and bonus shares in respect of shares acquired by British and foreign nationals

before they become ordinarily resident in the Union or in respect of shares which they subsequently inherited or acquired by donation if at the date of the donation the donor was a person not ordinarily resident in the Union.

There is also exempt from super tax dividends received by or accrued to any person ordinarily resident in the Union from a company registered in South-West Africa if the Commissioner for Inalnd Revenue is satisfied that the income of that company for the tax year in question was derived wholly or mainly from sources within South West Africa.

If a person carrying on a profession in the Union undertakes work outside the Union and for this purpose absents himself from the Union for a short period and returns to the Union to complete the work, the fees earned are deemed to be derived from a Union source. If an attorney, for instance, has an office in the Orange Free State and a branch office in Basutoland and employs a clerk at a fixed salary to work at both places, the salary earned by the clerk is derived partly from a Union source and partly from a non-Union source, the basis of allocation being the time spent in each place of business. If the clerk is engaged for the Orange Free State office only but occasionally attends to work at the branch office in Basutoland, the salary of the clerk is derived from a Union source unless the clerk is specially remunerated for work performed in the Basutoland office, in which case the special remuneration earned is from a non-Union source.

A ship's surgeon is liable for Union tax in respect of salary received provided he is ordinarily resident in the Union and his ship is under Union ownership, management or control.

Receipts or Accruals of a Capital Nature

Receipts or accruals of a capital nature are excluded from the definition of gross income, except where specially mentioned therein, and are not subject to income tax liability.

Examples of receipts or accruals of a capital nature are enumerated as follows:

1. Goodwill, provided it is not paid in the form of an annuity.
2. A gift or windfall, provided the gift is not paid in the form of an annuity.
3. A legacy or inheritance, provided payment does not take the form of an annuity.
4. Proceeds of matured life assurance policies.
5. Fortuitous winnings on sweep tickets.
6. Winnings from betting unless betting is engaged in as a profit-making scheme.
7. Profits from share dealings unless this constitutes the carrying-on of a business.
8. Restraint of trade. If a person receives consideration from a competitor for not carrying on with some proposed project, such consideration is a capital receipt and is not taxable.
9. Where improvements are effected by a lessee to leased property voluntarily, the value thereof is of a capital nature and not taxable in the hands of the lessor.
10. Damages. If compensation is paid in consideration of the recipient being deprived of a capital asset, such compensation is of a capital nature. Where an amount is received by way of damages or by way of settlement of an action for damages, such amount falls into the category of income if the transaction from which such damages flow is a transaction which if completed would have resulted in a gain (or loss) of a revenue, and not a capital nature. Thus damages arising from defamation of character or wrongful dismissal are not taxable. On the other hand damages received for breach of a service contract are taxable.
11. Compensation received as a result of the sterilization of a capital asset. Similarly compensation for physical loss or injury is not taxable.

B. The Nature and Type of Expenditure that is Allowable against the Income

General Principles

Before expenses can qualify for deduction they must run the gauntlet of two sections of the Act, namely section 11 (2) (*a*), which lays down that the deductions allowed shall be expenditure and losses actually incurred in the Union in the production of the income, provided they are not of a capital nature, and section 12 (*g*), which provides that no deduction shall be made in respect of any moneys claimed as a deduction from income derived from trade which are not wholly or exclusively laid out or expended for the purposes of trade. The proper method of approach in ascertaining whether expenditure is an allowable deduction or not is first to ascertain whether it is permissible under section 11 (2) (*a*), i.e. a positive test, and then to find out whether it is prohibited by section 12 (*g*), i.e. a negative test.

Review of Various Types of Expenditure

Bad Debts

Where the 'accrued' basis of determining income has been adopted, bad debts incurred will be allowed against the income. If the 'cash' basis has been adopted, bad debts incurred will not be allowed on the grounds that such income was not originally taken into account.

If the amounts allowed as bad debts are recovered later, they are subject to tax in the year of receipt. Where debts are known to be irrecoverable in any year prior to the year of assessment in which they were claimed, a deduction for such bad debts is not allowable. Where a professional practice is purchased and book debts are taken over and subsequently prove to be irrecoverable, such bad debts are not allowed as deductions from income earned subsequently, since they formed part of the capital assets acquired by the purchaser and the loss constitutes a loss of a capital nature. If the book debts recovered are in excess of the amount paid for their acquisition, such excess is not taxable, as it represents a capital accrual.

If a loan proves irrecoverable, it is not allowed as a bad debt, as it represents a capital loss. If, however, it is the accepted practice of a trade or profession to advance moneys to clients as part and parcel of the trade or profession, any losses arising from advances made would be allowed.

Travelling Expenses

A person is not allowed the expenses of travelling from his residence to his place of business. Expenses incurred in travelling from one place of business to another where a distinct and separate business is conducted are not allowed. Expenses incurred in travelling from one place to another in respect of the same business are allowed, e.g. from one surgery to a branch surgery. Thus, if an attorney practising in one town travels to another town to attend a board meeting of a company of which he is a director, the travelling expenses would not be allowed. If he has a branch office in another town, the expenses incurred in travelling to the branch office would be allowed as a deduction.

Travelling expenses incurred outside the Union are governed by section 11 (2) (*b*) which provides that any allowance is at the discretion of the Commissioner.

In I.T. Case No. 698, 17 S.A.T.C. 97, appellant incurred travelling expenses in connection with a trip abroad undertaken for a dual purpose, viz. (*a*) in respect of his diamond brokerage business, and (*b*) to explore the possibilities of opening up an export trade in various types of merchandise. The travelling expenses incurred in respect of item (*b*) were manifestly not allowable, being of a capital nature. It was held that where travelling expenses are expended for a dual purpose and one of those purposes would not qualify the expenditure for deduction for income tax purposes, no portion of the amount expended may be deducted.

In I.T. Case No. 693, 1951 (2) P.H., T. 31 (C), a university professor incurred travelling expenses etc. in proceeding overseas to undertake research work. It was held that such expenditure was not admissible, as it was not incurred in the production of income.

If an existing business opens a new branch and transports personnel to the new branch for that purpose, the travelling expenses incurred are regarded as pre-establishment expenses (i.e. capital expenditure) and not allowed. If an existing business transports personnel on transfer to an existing branch, the travelling expenses are allowed.

Entertainment Expenses

Where a person received a travelling or entertainment allowance he may be required to include in his income any portion of such allowance as was not actually expended in travelling and entertainment. In I.T. Case No. 679, 16 S.A.T.C. 349, it was said: 'On the above review of the Act, the Court is of opinion that in the case of expenditure or entertainment strict proof of

every item of expenditure is not a requisite in every case, but that it is open to the taxpayer to submit alternative evidence on the point; at the same time a mere estimate of such expenditure unsupported by the particular facts relating thereto, is insufficient.' In I.T. Case No. 727, 18 S.A.T.C. 91, a firm of consulting engineers claimed, inter alia, as an allowable deduction entertainment expenses amounting to £600. It was held that the case presented by the appellant in respect of the item entertainment expenses was too nebulous to enable the Court to determine whether they were in fact incurred in the production of the income.

Section 11 (2) (*p*) relaxes the requirements which previously attached to entertainment expenses as an admissible deduction and qualifies them for allowance to the extent of £150 (including club subscriptions) even if they do not result directly in the production of income but are incurred in the course of employment or the carrying on of a trade as a necessary concomitant thereof.

The current departmental practice in determining the allowance under this section is to accept as a rough-and-ready measure of the cost of such entertainment an amount equal to 2½% of the gross fees in respect of medical practitioners (GPs) and dentists and 5% of the gross fees in respect of medical specialists, accountants, attorneys, etc. Where the taxpayer can substantiate a claim in excess of the basic percentages specified, the Commissioner will permit such higher amount subject always to the allowance under this section being limited to £150. This procedure applies to future assessments only and assessments already issued will not be reopened.

Postgraduate Study Course

The provision introduced by the Income Tax Act 1956 dealing with expenditure incurred by any medical practitioner in respect of postgraduate study has been amended by the Income Tax Act 1957 so as to confer upon the Commissioner discretionary powers regarding the amount of expenditure he will allow under this category.

In addition the Commissioner will only consider the deduction provided the Dental Association of South Africa or the Medical Association of South Africa, as the case may be, certifies in such form as the Commissioner may prescribe that the claimant has practised his profession for not less than 3 years and has incurred such expenditure during the year of assessment in respect of the attendance by him of any postgraduate study course approved by such Association, to improve his qualifications for carrying on of his profession in the Union. Previously, the period of postgraduate study was fixed for a minimum period of 6 months and had to be conducted by a medical school or university. This allowance is now extended to dentists and medical practitioners, whereas previously it was confined to medical practitioners only.

Wear-and-tear Allowance

Wear and tear (generally known as depreciation) is only allowed in respect of assets which are used in the earning of income. No wear and tear is allowed in respect of buildings or structures of a permanent nature.

In the case of a medical practitioner, the initial purchase of surgical instruments will not be allowed as deduction, this being regarded as capital expenditure. Wear and tear in respect of surgical instruments is usually based on cost of replacements in subsequent years. The purchase of substantial additional equipment not required to replace broken or damaged equipment is regarded as capital expenditure and not allowed as a deduction in the year of purchase, but subsequent replacements of the additional equipment will be allowed in lieu of wear and tear.

The rate of allowance for wear and tear on furniture and fittings used for business purposes is generally 2½% to 5% per annum but lawyers may claim up to 7½%. Wear and tear at the rate of 7½% per annum is allowed in respect of law libraries and should be claimed in connection with medical books. If books bought in the course of practice are scrapped and sold, the loss should be claimed as scrapping allowance. Wear and tear allowed in respect of a motor-car used for business purposes is 15% to 20% per annum on reducing balances. In addition to the wear-and-tear allowance, the taxpayer is entitled to claim expenses for repairs effected.

Repairs

Section 11 (2) (*c*) of the Income Tax Act provides that there shall be allowed as deductions expenditure actually incurred during the year of assessment on the repairs of property occupied for the purpose of trade or in respect of which income is receivable, and sums expended for the repair of machinery, implements, utensils, and other articles employed by the taxpayer for the purposes of his trade.

Repairs incurred in respect of a motor-car used for business purposes are allowed as a deduction from income. If the motor-car is used both for business and private purposes, a proportionate amount of expenses incurred in respect of repairs etc. appertaining to business will be allowed. The rule is to require an actual statement of expenses incurred, but in the absence of actual details the taxpayer's estimation, if reasonable, of the motor-car expenses applicable to his business, is usually accepted by the revenue authorities.

If property used for business purposes has to be repaired, the cost thereof is allowable as a deduction. If, however, the property is materially altered, added to or improved upon, the cost thereof is not admissible, on the ground that such expenditure increases the capital value of the asset and therefore falls into the category of capital expenditure. If worn-out or deteriorated parts of a building are replaced by new parts, the cost of such new parts are allowed as repairs, regardless of the fact that they may be different in type and quality from the parts replaced. If renewals, however, are of such a nature that they constitute a reconstruction of the property, they will not be allowed.

Any expenses incurred in respect of a vacant property (including plots), from which no income is received, are not deductible. If, however, a person carries on the business of letting of properties, a temporary vacancy of one property will not necessitate a *pro rata* abatement of expenses incurred in the maintenance thereof. If a person repairs a property, after a period of letting, the repairs having been necessitated by the tenant's treatment of the property, and the owner effects the repairs after occupying the premises himself, such repairs cannot be claimed as a deduction from rentals received from the tenant. If, however, an unoccupied property is repaired with a view to letting, the cost thereof will be allowed.

Examples of Allowable Expenses

The various types of expenses incurred in the conduct of a medical practice that are allowed as deductions are enumerated as follows:

Salaries and wages paid to employees, accountancy and audit fees, interest on overdraft raised for business purposes, bank charges, telephone charges, postages, stationery, subscriptions to professional associations which are compulsory to enable the taxpayer to exercise his profession, electricity charges, motor-car licence, fire insurance relating to assets used for business purposes, rent, motor-running expenses, bad debts (where income is determined on 'accrued' basis), depreciation in respect of assets used for business purposes, legal expenses incurred in the recovery of outstanding fees (but not in respect of loans, unless it is the accepted practice of a profession to advance moneys to clients as part and parcel of the profession), a lump-sum paid to an employee in lieu of leave, an amount paid to an employee in lieu of notice.

Examples of Expenses which are not Allowed

No deductions are allowed in respect of the following items of expenditure:

Donations, gifts, private or domestic expenses incurred in the maintenance of the taxpayer and his family, income tax or provincial taxes paid, legal expenses incurred in drawing a lease, losses arising from theft or embezzlement, removal expenses relating to fixed assets, any expenses incurred in attending medical (or other professional) congresses or refresher courses, parking fines or legal costs incurred in defending prosecutions in respect of parking offences, etc., costs of appearance or representation arising from proceedings taken by the disciplinary committee of a professional council, damages paid for acts of negligence, legal expenses incurred in effecting registration or cancellation of mortgage bonds, conveyancing charges and transfer duty, cost of installing equipment, subscriptions to professional journals, subscriptions paid to learned societies by university lecturer.

MISCELLANEOUS MATTERS

Income Tax Repercussions Arising from Sale of Professional Practice

The income tax repercussions that may arise from the sale of a professional practice are enumerated as follows:

Goodwill is not subject to tax, on the ground that it represents a capital accrual. If the goodwill takes the form of an annuity, it is taxable in terms of section 7 (*a*).

If a professional practice is sold and payment of the purchase price arranged in the form of an annuity for the life of the seller, such annuity would constitute a capital payment as regards the purchaser but would attract income tax liability in the hands of the seller in terms of section 7 (*a*).

If assets used for business purposes, e.g. furniture, fixture and fittings, library, etc., are sold at a price in excess of their book value, the excess will be added back to income as recoupment of depreciation up to the extent of depreciation previously allowed.

If book debts are taken over by the purchaser and subsequently prove to be irrecoverable, they are not allowed as deductions from income earned subsequently.

Where an asset which ranked for wear-and-tear allowance is sold for less than the book value (i.e. cost less amounts previously allowed for wear and tear), the difference is deductible for income tax purposes as scrapped allowance—section 11 (2) (*j*). If a medical practitioner disposes of his practice, no scrapped allowance may be claimed.

Taxable Income of Public Servants

Section 19 of the Income Tax Act provides that the taxable income received by or accrued to or in favour of any person from employment in the public service or railway and harbour service of the Union in respect of such employment includes any payment made by way of allowance except payments made to meet expenditure incurred by such person in connection with his official duties.

In McCusker v. C.I.R., 1947 A.D., 14 S.A.T.C. 322, it was held that the term 'public service' is not confined to the meaning referred to in the Public Service Act, No. 27 of 1923, but includes any employment whether full-time or part-time in the service of the State.

A medical practitioner who holds an appointment as district surgeon and provides his own transport is not taxable in respect of the 1/– per mile allowed him to cover travelling expenses.

Claim for Deduction of Medical and Dental Expenses

A taxpayer may claim a deduction up to an amount of £100 per annum in respect of fees paid to dentists and medical practitioners for services rendered to himself, his wife and children, including fees paid to any nursing-home in connection with any confinement of his wife. This concession does not extend to fees paid to persons who are not dental or medical practitioners, e.g. masseurs, nor does it cover the cost of medicines. The cost of new dentures is allowed under this concession. The allowance under this heading has been extended in terms of the 1957 Income Tax Act to include fees paid to any duly registered nursing home of hospital in respect of a taxpayer's own illness or that of his wife, children or stepchildren.

Special deduction claim by physically disabled person

In the case of physically disabled persons whose incomes, including dividends, do not exceed £1,500 a year, a deduction from taxable income not exceeding £150 per annum is permitted in respect of expenditure which they have to incur to perform their work properly, e.g. the cost of a wheel-chair in the case of a cripple; the cost of spectacles.

Partnerships

In the case of a partnership, each partner is assessed separately in respect of his share of the profits or losses. It is necessary for each partner to complete a separate income tax return showing only his share of the profits or losses of the partnership together with any other income derived by him from other sources. A copy of the partnership financial statements signed by all the partners must be submitted with his income tax return in support thereof.

If there is a dissolution of partnership before the expiration of the tax year, accounts must be drawn up from 1 July to the date of dissolution to ascertain the profits or losses made by the partnership. Similarly, if an existing partnership admits a new partner(s), accounts must be drawn up to the date when the new partner(s) is admitted, to determine the profits or losses of the old partnership, and from that date to the end of the tax year to ascertain the profits or losses of the new partnership.

ANNUAL REPORT OF THE CHAIRMAN OF FEDERAL COUNCIL FOR THE YEAR ENDED 30 JUNE 1957

Obituary. It is with deep regret that we record the loss through death of the following members: Drs. J. D. Allen, F. P. Bester, H. E. C. Corkery, B. J. v. d. S. de Villiers, C. M. Edwards, I. Gloag, M. Gorfinkel, H. M. Griffiths, W. H. Herberg, S. Kantor, G. J. Key, J. I. Lipschitz, J. O. Marais, P. C. J. Meyer, R. D. Osler, M. Peskin, J. W. Rabkin, C. W. Rieniets, I. Rosenberg, C. P. Roux, A. Schmaman, M. A. Shapiro, J. Siebert, F. P. J. Snyman, S. Stern, A. F. Stewart, M. van den Ende and D. R. Viljoen.

Membership. During the past year there has been a net increase in membership of 94, the total membership now being 5,437. In addition there are 54 student members. Members are distributed as follows: Border Branch 196; Cape Eastern Branch 58; Cape Midlands Branch 210; Cape Western Branch 1,188; East Rand Branch 214; Griqualand West Branch 86; Natal Coastal Branch 534; Natal Inland Branch 190; Northern Transvaal Branch 531; Orange Free State and Basutoland Branch 377; Southern Transvaal Branch 1,298; South West Africa Branch 79; Transkei Branch 79; Vaal River Branch 56; Unattached Members 304; Emeritus Members 29; Honorary Members 8.

Honours. During the year the Council has honoured 6 members of the Association by the award of the Association's Bronze Medal for meritorious service to the Association. The members concerned are Dr. C. M. Grundlingh (Northern Transvaal Branch); Mr. L. B. Goldschmidt (posthumous), Dr. R. Lance Impey and Dr. J. P. de Villiers (Cape Western Branch); Mr. B. A. Armitage (Natal Inland Branch); Dr. M. Shapiro (Southern Transvaal Branch). In addition the Council honoured 5 members by electing them to Emeritus Membership of the Association. They were Drs. J. Luckhoff, J. G. Luyt, C. Muller, Elsie Chubb and H. M. Griffiths (Cape Western Branch).

Annual General Meeting. The Annual General Meeting for the current year took place in Cape Town on 3 October 1956. At the conclusion of the formal business, Dr. J. S. du Toit, of Cape Town, was inducted as President by Dr. J. H. Struthers, the retiring President. The meeting was then adjourned until the evening, when it was re-convened in the Jameson Hall at the University of Cape Town at a function where the President delivered his Presidential Address and the presentation of awards took place. The adjourned Annual General Meeting was followed by a reception arranged by the Cape Western Branch, at which the President of the Association and Mrs. Du Toit and the President of the Branch and Mrs. Owen-Smith received the guests.

Congress. No Congress was held during the current year, and members look forward to the next Congress, which is to be held in Durban in September 1957.

Federal Council. Two meetings of the Council have been held during the year under review. The first of these was held in Cape Town on 3-5 October 1956, and the second took place in Johannesburg on 27-29 March 1957. The average attendance was 50 members. The Executive Committee has met on 2 occasions, both of these on days immediately preceding the Council meetings. The major part of the work of this Committee has been conducted by correspondence.

Committees of Council

The Head Office and Journal Committee continues to rendes service in looking after the administrative and financial affairr of the Association. The provision of increased accommodation for the Head Office and Journal staff has been met by the addition of 4 floors to Medical House, Cape Town.

The Federal Ethical Committee had two matters referred to it during the year under review.

The Central Committee for Contract Practice has continued to do a considerable amount of routine work and has dealt with a number of new applications from societies for recognition. The policy of the Council, adopted at its meeting in Vereeniging in April 1956, appears to be working satisfactorily. The Assistant Secretary appointed in the Transvaal will shortly take over all Contract Practice administrative work. There was some delay in the final approval of the new Tariff of Fees for Approved Medical Aid Societies, which was to have come into operation on 1 January 1957. Owing to these delays it is not likely to come into effect until the second half of 1957.

The Parliamentary Committee has continued to watch the interests of members in so far as legislation is concerned and has taken up a number of matters which have been submitted to it, most of which have been brought to a satisfactory conclusion.

The Workmen's Compensation Act Sub-Committee continued its work, and the year under review saw the publication of the new Workmen's Compensation Act Handbook and the latest tariff of fees for this form of practice.

The Sub-Committee on the Economics of Medical Practice, which had done a considerable amount of work, resigned after submitting its report in October 1956. The matter was then referred to the Executive Committee of Council, and at its meeting in March 1957 the Council appointed a new Committee in Pretoria to deal with these questions.

The various other Committees appointed by Federal Council for special purposes have done useful work in the spheres allotted to them.

Journal. The weekly publication of the *South African Medical Journal* continues to meet with success, but the Association's quarterly journal, the *South African Journal of Laboratory and Clinical Medicine*, has not the wide circulation which it was hoped it would have. During the year under review, two Hamilton-Maynard Memorial Medals were awarded. These were to Mr. T. Schrire for his paper entitled 'Modified Radical Gastrectomy for Cancer of the Stomach,' which had appeared on page 494 of the *South African Medical Journal* of 22 May 1955, and to Dr. W. P. U. Jackson for his paper entitled 'Osteoporosis—Commonest of All Diseases?' published on page 885 of the issue of 17 September 1955. The Leipoldt Memorial Medal was awarded to Dr. L. Solomon, of Upington, for his paper entitled 'Acute Dilatation of the Stomach' published on page 386 of the *South African Medical Journal* of 23 April 1955. The presentation of these awards took place at the adjourned Annual General Meeting in Cape Town.

Branches and Divisions. These continue to hold regular meetings. During the year under review, the Vaal River Branch was formed out of the Vereeniging Division of the Southern Transvaal Branch.

Groups. These have continued to perform the tasks for which they were established. A specially appointed Sub-Committee has been examining the functions of the Groups, but no decision has yet been reached as to whether these should be definitely curtailed.

World Medical Association. The Tenth General Assembly of the World Medical Association was held in Havana, Cuba, during September 1956. The Association's official delegate to the Assembly was Dr. Emilia Krause, of Bloemfontein.

Finance. The accumulated funds of the Association decreased by £2,938 during 1956 and they now stand at £31,043. During 1956 a grant of £500 was made to the Southern Transvaal Branch.

Benevolent Fund. There are now 24 beneficiaries of this Fund. During the year ended 31 December 1956, grants totalling £3,119 16s. 0d. were made, and at the end of the year the accumulated funds stood at £43,713.

Library Grants. Grants of £250 each were made during 1956 to the Libraries of the Universities of Cape Town and the Witwatersrand, and grants of £100 each were made to the Libraries of the Universities of Pretoria, Natal and Stellenbosch.

Medical Agencies. The two Agencies maintained by the Association in Cape Town and Johannesburg have both shown an increase in service to members, who are asked to make full use of the facilities which are provided.

Medical Insurance Agency. This department is still well supported. In addition to the insurance cover which has for so long been supplied to the Association by the Atlas Assurance Company, arrangements have now been made whereby members may seek protection through the Medical Protection Society in London. A South African branch of the Protection Society has been formed and its office is at the Association's Head Office. Members are urged to make use of the facilities offered by the Association in connection with all forms of insurance and are reminded that the activity of this Agency adds to the Association's funds by means of the commissions earned.

Staff. Dr. P. D. Combrink was appointed to be Assistant Secretary in the Transvaal, with headquarters in Pretoria. He assumed duty on 1 January 1957, and has offices in Medical Centre, Pretorius Street, Pretoria. He has already given valuable service in connection with the Parliamentary Committee and other Committees, and is a useful liaison officer for the Association in connection with Government Departments.

Conclusion. On behalf of the Council, I would thank all who have contributed to the work of the Association during the year under review. Numbers of honorary officials and members of Committees have rendered valuable service, and I would also record appreciation of the loyal cooperation of the Association's full-time staff.

A. W. S. Sichel
Chairman of Council

Cape Town
July 1957

REGISTRATION OF ADDITIONAL QUALIFICATIONS

In Government Notice No. 978 of 5 July 1957 an amendment (approved by the Minister of Health) is published to the Rules of the South African Medical and Dental Council regarding the Registration of Additional Qualifications (which were published under Government Notice No. 2440 of 1955[1]) adding the following qualifications to the list of additional (medical) qualifications that may be registered:

Fellow of the Faculty of Anaesthetists of the Royal Australian College of Surgeons—F.F.A., R.A.C.S.

The degrees of Master of Medicine of the University of Cape Town in Surgery—M.Med. (Surg.), Univ. Cape Town, Orthopaedics—M.Med. (Orth.), Otorhinolaryngology—M. Med. (Otol.), Ophthalmology—M. Med. (Ophth.) and Obstetrics and Gynaecology—M. Med. (O. and G.).

The diploma in Anaesthesia of the University of Sydney—D.A. Univ. Sydney.

1. S. Afr. Med. J. (1956), **30**, 325.

REGISTRASIE VAN M.B., Ch.B. (STELLENBOSCH)

In Goewermentskennisgewing No. 930 van 28 Junie 1957 is 'n Wysiging (gemaak deur Sy Eksellensie, die Amptenaar belas met die Uitoefening van die Uitvoerende Gesag) gepubliseer tot die ,Reëls ten opsigte van die Grade, Diplomas of Sertifikate wat Mediese Praktisyns en Tandartse die reg tot Registrasie gee (gepubliseer onder Goewermentskennisgewing No. 321 van 1956[1]

en gewysig deur Goewermentskennisgewing No. 1093 van 1956[1]) wat, onder die opskrif van, Unie van Suid-Afrika', die kwalifikasie Baccalaureus in Geneeskunde en Baccalaureus in Chirurgie van die Universiteit van Stellenbosch byvoeg. Hierdie wysiging voeg die graad M.B., Ch.B. (Univ. Stell.) tot die ooreenstemmende grade van die Universiteite van Kaapstad, Pretoria, Witwatersrand en Natal in die lys van grade van Suid-Afrikaanse Universiteite wat die houer daarvan die reg gee om as 'n mediese praktisyn te registreer.

1. S. Afr. T. Geneesk., (1956): **30**, 668.

HABIT-FORMING AND OTHER 'DANGEROUS' DRUGS

Legal action was recently taken against a medical practitioner for failing to keep proper records concerning the dispensing of habit-forming drugs, and practitioners' records have of late been the subject of official investigations. It is a matter of general importance to the profession that the requirements of the law concerning the dispensing of (1) poisons, (2) habit-forming drugs, and (3) potentially harmful drugs, should be observed. These three clases of 'dangerous' drugs are respectively listed in the 4th, 5th and 6th schedules of the Medical, Dental and Pharmacy Act as amended.

Some of the obligations in this respect that are imposed on medical practitioners by the amended Act were detailed in the *Journal** of 11 December 1954, and they are again set out here:

PRESCRIPTION BOOK

Every medical practitioner who dispenses medicine must keep a prescription book in which he is to enter certain particulars concerning any medicine he dispenses which contains either a poison,[1] a habit-forming drug,[2] or a potentially harmful drug.[3] The particulars that must be entered are the name and quantity of each ingredient of the medicine, the name and address of the person to whom it is supplied, and the date when it is supplied. Although the relative sections leave room for argument, this appears to sum up the intention of the Act as regards the prescription book, and apart from legal requirements it is a wise precaution on the part of the dispensing doctor to keep records in the manner thus laid down.

REGISTER OF HABIT-FORMING DRUGS

The medical practitioner who 'uses or compounds or dispenses' any habit-forming drug is required[4] to cause to be entered in a book called the 'register of habit-forming drugs' (to be kept exclusively for this purpose): (*a*) the quantity of such drugs possessed or acquired by him, (*b*) the date of the acquisition, (*c*) the person from whom and the place from which the same was acquired, and (*d*) the quantity disposed of and whether (i) by sale (in which case the date of the sale and the name and address of the purchaser must be entered) or (ii) by dispensing or use in the ordinary course of practice.

There is, however, a proviso[4] that, where the practitioner keeps a prescription book (or a day book) in the manner we have indicated, it is sufficient for him to record in his register the total quantity of each habit-forming drug used for dispensing and the serial number of the relative entries in the day book or prescription book.

The register must be properly kept up to date and must be balanced so as to show the quantity of each habit-forming drug in stock on the last day of every March, June, September and December (the balancing to be completed within 3 days of those dates)[5]. The register must be kept and retained for 3 years and is open to inspection by persons authorised in writing as prescribed by the Act.[6]

No habit-forming drug acquired by a medical practitioner shall be used by him except for strictly medicinal purposes.[7] It may not be used for the satisfaction or relief of a habit or craving except in certain approved institutions. It is also an offence for any person to keep in his possession or control any habit-forming drug[8] or any poison[9] without using all reasonable care in its custody or use. Every medical practitioner also 'shall label with the words "Poison" and "Vergif" every vessel, box, bottle, wrapper or package in his possession which contains any article which is a poison'.[10] This requirement, however, does not apply to any medicine dispensed by a medical practitioner if it is labelled with his name and address and the relative particulars are entered in his prescription book[1] (see above).

There is a similar proviso conditionally exempting medicines dispensed by a medical practitioner from the requirement that medicines for external use containing a poison must be in a container distinguishable by touch (i.e. a 'poison bottle') and labelled 'For External Use Only—Alleen vir Uitwendige Gebruik'.[1] Apparently the Act contains no such exemption in respect of potentially harmful drugs[11]; the omission of the exemption would appear to be an oversight.

LABELLING OF MEDICINE DISPENSED BY DOCTOR

Finally, amongst the obligations imposed on medical practitioners who dispense, is one introduced by regulations made by the Minister under section 42 of the Food, Drugs and Disinfectants Act, 1929. These regulations prescribe that every package containing any food or drug must be labelled with the name and business address of the . . . person by whom or on whose behalf it was enclosed in the pacakge. 'Drug' is defined as any substance or mixture of substances used as a medicine, whether internally or externally, and it is therefore held that a medical practitioner who dispenses his own medicine must label all the containers with his name and address, irrespective of whether or no the medicine contains poisons or other scheduled drugs.

PRESCRIBING OF HABIT-FORMING DRUGS

Passing to certain legal requirements which are the concern of all practising doctors, and not only those who dispense, we end with the following:

Every prescription ordering any habit-forming drug must state the name and quantity of such drug that may be sold or supplied, the name and address of the person to be supplied and of the practitioner signing (as well as the qualification of the latter), and the date of issue of the prescription; and not more than one issue of the drug may be made on the prescription.[12]

The same provisions apply to prescriptions ordering any potentially harmful drug (though not poisons as such), with the difference that the prescription containing the potentially harmful drug is to state the number of times and the intervals at which the prescription may be dispensed, and (except for medicine for external use) the amount and frequency of each dose. Nevertheless, in emergencies any potentially harmful drug may be sold or supplied on the verbal instructions of a medical practitioner given direct to the chemist, if the practitioner is personally known to him; in which case the practitioner is obliged within 24 hours to furnish the chemist with a written prescription complying with the requirements of the Act.[13]

References to the Medical, Dental and Pharmacy Act No. 13 of 1928 (as amended).

1. Sections 55 and 56.
2. Sub-section 6 of section 65.
3. Sub-section 2 of section 65 *bis*.
4. Sub-section 6 of section 65.
5. Sub-section 7 of section 65.
6. Sub-section 8 of section 65.
7. Sub-section 2 of section 65.
8. Sub-section 2 of section 61.
9. Section 54.
10. Section 49.
11. Sub-section 1 (*b*) of section 65 *bis*.
12. Sub-section 5 of section 65.
13. Sub-sections 1, 5 and 6 of section 65 *bis*.

*Editorial (1954): S. Afr. Med. J., **28**, 1053.

NUWE PREPARATE EN TOESTELLE : NEW PREPARATIONS AND APPLIANCES

Ef-Cortelan with Neomycin Skin Ointment

Glaxo Laboratories announce an addition to their Ef-Cortelan range by the introduction of Ef-Cortelan with Neomycin Skin Ointment, and submit the following statement.

This product is available in 5 g. tubes containing 1% hydrocortisone acetate and 0·35% neomycin base (equal to 0·5% neomycin sulphate), in a non-greasy base.

For dispensing purposes, the outer printed carton is disposable, as also the label on the tube, leaving a suitably unlabelled tube in an unprinted white carton.

To the well-known beneficial effect of hydrocortisone in a variety of dermatological conditions, is now added neomycin. When the known or suspected cause of inflammation is infection, tissue resistance is lowered by hydrocortisone and, until recently concurrent antibiotic therapy has been necessary. Neomycin is a bactericidal antibiotic of low sensitizing potential and negligible irritant properties; it has a wide anti-bacterial range and is particularly effective against Gram-negative bacteria.

* * *

Distaquaine V Series of Preparations New Strengths

British Drug Houses make the following announcement: Since the successful introduction of Distaquaine V Tablets (phenoxymethylpenicillin, penicillin V) and Distaquaine V Sulpha Tablets in 1956, much research work has been carried out to determine whether the very high blood levels of penicillin necessary for the treatment of certain conditions can readily be obtained with phenoxymethylpenicillin. Laboratory and clinical evidence now abundantly confirms that these high blood levels can be adequately and reliably produced by a massive dose regime of oral penicillin V. For example, cases of sub-acute bacterial endocarditis have been treated with doses up to 1·2g. every 4 hours and several workers have confirmed that these doses were invariably well tolerated.

The clinical application is that it is now possible to treat certain diseases with Distaquaine V Tablets without resort to parenteral therapy. To facilitate the prescription of large doses British Drug Houses have enlarged our range of strengths and as from 9 July the Distaquaine V series will consist of the following:

Distaquaine V Tablets 60 mg. *Cartons of 12. Bottles of 30 and 200.

Distaquaine V Tablets 120 mg. *Cartons of 12. Bottle of 100.
Distaquaine V Tablets 240 mg. *Cartons of 12. Bottle of 100.
Distaquaine V Sulpha Tablets. *Cartons of 12. Bottles of 30 and 200.

* Each tablet enclosed in gold aluminium foil.

PASSING EVENTS : IN DIE VERBYGAAN

Prof. James T. Louw, M.Ch. (Cape Town), F.R.C.O.G., has, as from the end of 1957, resigned the position of Professor of Obstetrics and Gynaecology at the University of Cape Town, which he has held for the past 6 years.

* * *

Dr. Rhoderic W. A. Nel, M.B., Ch.B. (Cape Town), L.M. (Dubl.), D.Obst., R.C.O.G., M.R.C.O.G. (Lond.), has commenced practice as a Gynaecologist and Obstetrician at 705 Groote Kerk Buildings, Parliament Street, Cape Town. Telephones: rooms 2-4613, residence 97-9242.

* * *

Dr. Gerald J. Sutin, M.B., Ch.B. (Cape Town), M.R.C.P. (Edin.), D.C.H. (Lond.), recently Clinical Fellow in Medicine and Research Fellow in Cardiology, Children's Medical Centre, Boston, USA, and formerly Registrar at Groote Schuur Hospital, Cape Town, has commenced specialist practice as a Paediatrician at 316 Medical Centre, Heerengracht, Cape Town. Telephones: rooms 3-6298, residence 4-7919, if no reply, 69-2924. These telephone numbers are not in the medical list of the current telephone directory.

* * *

Mr. Louis Blumberg, M.B., Ch.B. (Cape Town), F.R.C.S. (Eng.), Surgeon, has changed his address to 1010 Medical Centre, Heerengracht, Cape Town. His telephone numbers are unchanged, namely, rooms 2-8800, residence 7-9548.

* * *

Dr. Louis F. Freed, M.A., M.D., D.Phil., D.P.H., D.T.M. and H., F.R.S. S.Afr., of Johannesburg, is to be awarded the Diploma in Psychological Medicine at the forthcoming graduation ceremony of the University of the Witwatersrand.

* * *

Mr. J. J. Brossy, M.B., B.Ch., F.R.C.S. (Eng.), after a stay of 5½ years in England and America, has commenced surgical practice at 113 Lister Building, Jeppe Street, Johannesburg (telephone 22-4200) and at 14B Admirals Court, Rosebank, Johannesburg (telephone 42-4486). Other telephone numbers: emergency 22-4191; residence (from 1 September 1957) 42-3074.

* * *

Medical Practitioners in Nyasaland. At 31 December 1956 the registered medical practitioners in Nyasaland numbered 65, the 'licensed' medical practitioners 11, and the registered dentists 8. Of 65 registered medical practitioners 13 held South African qualifications (Cape Town 9, Witwatersrand 2 and Pretoria 2). This information comes from Federal Notice No. 343 of 1957 published in the Federal Government Gazette of Rhodesia and Nyasaland, which (under the Medical Practitioners and Dentists Registration Ordinance, Chapter 68, of Nyasaland), sets out lists of these practitioners.

* * *

Dr. M. M. Suzman, who has been overseas for some weeks, returned to Johannesburg on 21 July. In addition to the engagements in the UK which have already been announced, Dr. Suzman was invited to participate in the symposium on Arterial Embolism held at the annual meeting of the British Medical Association at Newcastle on 16 July at a combined session of the sections of Surgery, Medicine and Cardiology. At the Harvey Tercentenary celebrations South Africa was represented by Mr. L. Fatti and Dr. A. L. Jackson, as well as by Dr. Suzman.

* * *

Dr. Sidney Stein, of Cape Town, has left to attend the 11th International Congress of Dermatology in Stockholm, accompanied by Mrs. Stein. They will be visiting various centres in Europe and the USA before returning to South Africa in November.

* * *

University of the Witwatersrand. The following higher degrees and diplomas were awarded at the March and June Graduation Ceremonies: *Doctor of Medicine*, P. W. Fleming and P. E. Marchand, *Diploma in Surgery*, L. A. du Plessis.

* * *

Out of 62 *papers from* 22 *countries* the Ciba Foundation's awards for 1957 for Research Relevant to the Problems of Aging have been made as follows (the names of leading authors only are given):

Dr. Hedwig Saxl (Leeds). 'The physiological significance of the reaction between elastin and elastomucase in relation to the production of 'clearing factor.' £350.

Dr. G. F. Wilgram (Toronto, Canada). 'An aetiological concept of atherosclerosis based on experiments in rats.' £350.

Dr. R. J. Boucek (Miami, USA). 'The effects of age, sex and race upon the chemistry of biopsy connective tissue'. £300.

Dr. B. T. Donovan (London) and Dr. J. J. van der Werff ten Bosch (Leiden), jointly. 'Mechanisms concerned in the regulation of the onset of puberty.' £300.

Dr. R. F. Hellon (Oxford). 'The effect of aging on the heat regulatory mechanisms.' £300.

Dr. H. G. Isler (Montreal, Canada). 'Influence of age on the production of thyroid tumours in the rat.' £300.

Prof. L. Haranghy (Budapest). 'Sclerosis of the spleen in old age and concomitant changes of the bone marrow in regard to geriatrics.' £200.

Dr. Patricia Lindop (London). 'Aging effects of ionizing radiations.' £200

The awards are being offered again in 1958, the closing date for entries being 1 January 1958, and further information may be obtained from the Ciba Foundation, 41 Portland Place, London, W.1.

* * *

South Africans will be interested to hear of the K.C.V.O. conferred in the recent Birthday Honours on Mr. Ralph Marnham, M.A., M.Chir. (Camb.), F.R.C.S. Surgeon to Her Majesty the Queen, and senior surgeon to St. George's Hospital, London, who has been for some years a member of the Council of the Royal College of Surgeons of England and an examiner in the Final Fellowship examination. Sir Ralph, who was born at Stellenbosch where his father was a bank manager, went to Diocesan College, Rondebosch and received his further education at St. George's Hospital and Cambridge. His mother, Mrs. J. E. Marnham, still lives at Stellenbosch.

* * *

Union of South Africa. Department of Health. Notification of formidable epidemic diseases and poliomyelitis in the Union during the period 5 July—11 July, 1957.

	Poliomyelitis				
	Eur.	*Nat.*	*Col.*	*As.*	*Total*
Transvaal	—	—	—	—	—
Cape Province ..	3	—	4	—	7
Orange Free State ..	—	2	—	—	2
Natal	—	—	—	—	—
Totals	3	2	4	—	9

Plague, Smallpox, Typhus Fever. Nil.

● ● ●

Dr. Robert Slome, M.D., M.R.C.P., Physician, has commenced practice at 414 Medical Centre, Heerengracht (lower continuation of Adderley Street), Cape Town. His telephone number, 2-0762, remains unaltered.

REVIEWS OF BOOKS : BOEKRESENSIES

VISUAL FIELDS

The Visual Fields. A Textbook and Atlas of Clinical Perimetry By David O. Harrington, A.B., M.D., F.A.C.S. Pp. 327. 234 Illustrations, 9 in colour. South African Price: £6 16s. St. Louis: The C. V. Mosby Company. 1956.

Contents: Introduction. *Part I. The Examination of the Visual Field.* 1. Perimetry Without Special Instruments. 2. The Instruments of Perimetry and Their Use. 3. Special Perimetric Techniques. 4. The Anatomy of the Visual Pathway. 5. The Vascular Supply of the Visual Pathway. 6. The Normal Visual Field. *Part II. The Interpretation of Defects in The Visual Fields.* 7. The Abnormal Visual Field. 8. Opacities of the Media (Cornea, Lens, and Vitreous) and Their Effect on the Visual Fields. 9. Diseases of the Choroid. 10. Diseases of the Retina. 11. Glaucoma. 12. The Toxic Amblyopias. 13. The Optic Nerve. 14. The Chiasm. 15. The Postchiasmal Visual Pathway. 16. Disturbances of Psychogenic Origin. Bibliography.

In describing the 'island hill of vision surrounded by the sea of darkness', the author has meticulously explored the coastline and its cliffs, its summit and pit; and has described the catastrophes occurring when the island sinks into the sea or develops erosions of its coastline, peak or plateau.

Part I covers the method of exploration of this island hill, its average isopters and the instruments available. Like Traquair, the author prefers the non-mechanical perimeter, putting in a special plea for his own instrument, using 'black light'. He reminds us how much information can be elicited from a properly performed confrontation test. He reverses the usual routine by using the tangent screen first and the perimeter afterwards. He considers our present method of colour perimetry not worth the effort involved. The substitution of coloured objects for white is really a convenient method of reducing the strength of the stimulus without reducing its area. The chapter on anatomy is not exhaustive but adequate.

Part II deals with the interpretation of the defects disclosed by the above examination and correlated with the clinical picture.

The author can be rightly proud of the profuse and beautiful illustrations accompanying the text, and can be complimented on fulfilling his object of producing a volume which can serve as an Atlas, as well as a useful text-book, for all those interested in the study of ophthalmology, neurology or neuro-surgery. As such it can be fully recommended.

L.S.

CORRESPONDENCE : BRIEWERUBRIEK

DOKTERS SE HOUDING TEENOOR BELEMMERDE PERSONE EN REHABILITASIE

Aan die Redakteur: Daar is vandag die veranderde houding teenoor die belemmerde persoon, asook die houding van die mediese dokter teenoor rehabilitasie van die belemmerde persoon.

Die Mediese Vereniging van Suid-Afrika het besef dat daar by die Unie-Regering aangeklop moet word, dat die tyd aangebreek het dat 'n Nasionale Raad vir Rehabilitasie in Suid-Afrika gestig moet word (1954). Die Unie-Regering was daarmee eens daar die ongeskiktheidstoelaes wat jaarliks aan belemmerde persone betaal word, en duisende van ponde beloop, beter aan 'n program van rehabilitasie bestee kan word, sodat 'n belemmerde persoon sy gewig in die samelewing kan behou, deur sy bestaan te kan verdien soos enige normale mens.

By 'n Internasionale Vergadering van die ISWC gehou in Den Haag, Holland, in 1954, moes ek die bespreking inlei van 'n voordrag ‚Public Understanding and Support of Services for the Crippled' deur dr. A. R. Shands, Jr. Mediese Direkteur van die Alfred du Pont-Instituut, VSA en prof. F. Langenskiöld, President van die Invalide Stigting van Finland.

Dr. Shands het die mediese dokters in 5 klasse verdeel en ek sal graag dat onse mediese dokters 'n studie daarvan sal maak om te sien tot watter groep hulle behoort wanneer hulle met 'n belemmerde persoon te doen het.

Sommige dokters het geen of 'n beperkte begrip van wat bedoel word met rehabilitasie verder as net geneeskundige aandag nie. Die ‚verdraagsame houding-groep' bestaan uit die geneeshere wat net in die eerste stadium van mediese genesing geïnteresseerd is, naamlik die beperkte klagte waarmee die pasiënt na die dokter kom.

Hierdie groep het geen beswaar teen die verdere behandeling van pasiënte nie, maar omdat hulle so min weet van die volledige program wat rehabilitasie vereis, stel hulle nie belang om die pasiënt verder te help nadat die wond of die siekte genees is nie. Hierdie groep word gevorm deur ongeveer 30% van die geneeshere.

Die tweede groep is verreweg die grootste, en bestaan uit geneeshere wat weet dat die pasiënt meer as net mediese behandeling nodig het, maar wat nie bereid is om hierdie verantwoordelikheid te aanvaar nie. Hierdie groep bestaan uit 50% van alle geneeshere en word die ‚passiewe houding-groep' genoem.

Die ‚geïntereseerde groep' bestaan uit 15% van die geneeshere.

Hulle sou graag meer wou doen vir die belemmerde persoon, maar ontvang geen leiding hoe om so 'n program te behartig nie. Hierdie groep behoort meer aandag te ontvang, aangesien hulle tot groot hulp kan wees as hulle geleer word om aan 'n rehabilitasie-program mee te doen.

Dokters wat werklik belangstel en die geweldige sosiale en ekonomiese waarde van rehabilitasie-programme in hospitale en in die gemeenskap besef, vorm die ‚entoesiastiese groep'. Hulle is min en bestaan uit ongeveer 3%. Hulle is egter dikwels geneeshere met groot praktyke wat hulle aandag vereis, sodat hulle nie alles kan doen wat hulle graag sou wou doen nie. Omtrent 25% van die ortopediste val in hierdie groep.

Die vyfde en laaste is die kleinste groep en bestaan uit slegs 1%. Dit is die dokters wat hulle volle gewig op hierdie gebied van rehabilitasie ingooi. Hulle het reeds daarin geslaag om verskeie liggame te oortuig van die waarde van 'n rehabilitasieprogram, asook die publiek en die mediese beroep. Dit is egter jammer dat hulle nog nie hulle kollegas ook ten volle kon oortuig nie, want die volslae sukses van so 'n program vereis ook mediese ondersteuning.

Onlangs het die Minister van Arbeid in die Parlement bekiemtoon hoe dringend die saak is en het groot belangstelling onder die Parlementslede verwek.

Daar sal minder oor geneeshere deur lede van die publiek geskinder word as die dokters besef in welke groep hulle val wanneer die pasiënt rehabilitasie vereis.

Emilia Krause
Voorsitster, O.V.S. Vereniging ten bate van Kreupelkinders

S.A. Mutual-Gebou
Bloemfontein
Julie 1957

DIE KERK SE DANK AAN GENEESHERE

Aan die Redakteur: Graag wil ek die volgende besluit van die sinode van die Nederduitse Gereformeerde Kerk van Transvaal onder die aandag van die lesers van u geëerde blad bring:

Die Algemene Sinode van die Ned. Geref. Kerk van Transvaal het tydens sy onlangse sitting te Pretoria, namens sy ongeveer 300 leraars eenparig die volgende besluit geneem en vertrou dat dit onder die aandag van die betrokke geneeshere en ander lede van die mediese professie gebring sal word:

‚Die sinode wil sy erkentlikheid en dankbaarheid uitspreek teenoor die geneeshere en ander lede van die mediese professie, wat op onbaatsugtige wyse hulle dienste met soveel liefde en bekwaamheid aan evangeliedienaars en hulle gesinne kosteloos betoon, asook teenoor almal in die mediese professie wat in noue samewerking met evangeliedienaars hulle professionele werk verrig.'

A. J. V. Burger
Assessor

Die Nederduitse Herv. of
Geref. Kerk van Suid-Afrika
Elmstraat 4
Houghton
Johannesburg
4 Julie 1957

TONSILS AND ALCOHOLISM: AN ENQUIRY

To the Editor: A paragraph has appeared in the Adelaide *Advertiser* stating that a Durban doctor has found from examination of the throats of inebriates in hospitals and institutions that lack of tonsils is one of the causes of alcoholism. I should be grateful if the author of these observations would communicate with me.

S. V. Humphries

Hospital
Tennant Creek, N.T.
Australia
7 July 1957

NAUDÉ VERSUS WHITTLE

To the Editor: With reference to the report on the case of Naudé vs Whittle[1] published in the *Journal* of 8 June 1957 a meeting was held by this Branch at which the matter was discussed. It was unanimously decided that as this decision might affect any practitioner this Branch should support Dr. Naudé in the Appeal which he has now opened.

As a result each member of this Branch will donate a minimum of £1 towards a fund for the Appeal, which will be raised through the medium of this Branch.

An appeal is made to practitioners to support the fund, for it is felt that the outcome of this case will directly affect us all.

Donations may be sent to: Naudé Appeal Fund, Box 1, Lusikisiki, Transkei.

S. E. Vincent
Chairman, East Griqualand and East Pondoland Divisions, Transkei Branch.

Box 1
Lusikisiki
Transkei

1. Report (1957): S. Afr. Med. J., **31**, 571.

PHARMACEUTICAL ADVERTISING

To the Editor: Your editorial[1] of 29 June rightly pays tribute to modern pharmacy, pharmaceutical production and the massive expenditure, both direct and indirect, of pharmaceutical houses in the field of research.

You then go on to 'wonder how much the cost of medicines is increased by expenditure on advertising'. There are many who could prove that the word 'increased' should be altered to 'decreased' although admittedly there is a limit to the amount of advertising which is economically possible as well as aesthetically and ethically desirable. However, there is another point of view which in these days of 'high cost of medicine', 'exhorbitant charges' and similar complaints by the public at large and not a few members of the medical profession could well be publicized to the advantage of everyone concerned.

Statistics produced in the United States present a picture which would seem to indicate that either the modern method of promoting new and wonderful drugs is paying for itself or else medical treatment has become wonderfully cheap. Moreover, if it is the latter, then it must be because of the development of new drugs and the modern methods of producing and promoting them out of the profits made from them!

Apparently the annual expenditure in the US *per capita per annum* for drugs is £3 12s. 0d. as compared with an expenditure of £20 *per capita per annum* on alcoholic beverages, £11 on tobacco and cigarettes and, as a matter of interest and by way of comparison, £6 8s. 0d. per year on car maintenance, repairs and parking. Analysing the amount spent on medical care and prescriptions in the US and taking for comparison 1939 and 1957 (because 1939 was just before the introduction of the bulk of the present chemotherapeutic agents and antibiotics and 80% of todays prescriptions could not have been written then) we find that in 1939 2s. in the £ of disposable income was used for medical care whereas today it is just under this figure. Still more impressive is the comparison of the amounts spent on prescriptions. Out of each £ spent on medical care in 1939, 3s. 7d. was spent on prescriptions. Today the amount is 2s. 9½d.

To these material advantages can be added the following gains, not only to the individual and his family but to a nation as a whole. The average hospitalized patient today spends 9·2 days in hospital as against 12·5 days in 1939. The death rate from pneumonia has decreased by 61%, rheumatic fever 41%, appendicitis 16% and so on. Finally, the average life span in 1939 was 63·7 years whereas today it is 70·1 years.

It is reasonable to suppose that the comparative figures for South Africa are not widely dissimilar to the above and in this connection it is interesting to note that there are a number of examples of the newer drugs which sell on prescription at lower prices here than in the US. After allowing for the improvement in medical skill and diagnosis during the intervening years (without which the modern drugs would be so much less effective) it would seem that, within his limited sphere of technical adviser, the 'medical representative' is a purveyor of economy in money and human suffering as well as information about his products.

E. H. Lambert
Chairman, South African Pharmaceutical Manufacturers' Association

P.O. Box 3051
Port Elizabeth
17 July 1957

1. Editorial (1957): S. Afr. Med. J. **31**, 635.